ELECTRICAL INDUSTRIES IN THE STATE OF NEW YORK.

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In its limited sphere, this report is practically a record of the beginning of industries which are so far-reaching in their influences upon human activities and are of such economic importance that they are destined to mark an era in history worthy of being known by the distinctive title of the "Electrical age".

The report is based on returns made by corporations, firms, and persons engaged in electrical industries as they existed in the state of New York during the year ended May 31, 1890. This fact should be kept clearly in mind by all who examine the text or tables of the report, because of the many and important changes which have occurred since that period. It is not probable that the data presented herewith fairly represent the present conditions of any of these industries.

The commercial telegraph and telephone companies and the statistics relating to the manufacture of electrical apparatus and supplies are not presented in this report.

HISTORICAL.

As items of historical interest, and to show how young the electrical industries really are, the following memoranda are presented to indicate the initial points of several important lines of development.

POLICE TELEGRAPH.

The police telegraph was established in New York city in 1856. The "dial" system in each of the 24 precinct stations provided for that part of the city south of the Harlem river. Mr. William Robinson was the superintendent of telegraph, and it is believed that he was the inventor of the system. He had two assistant operators and one lineman. The business was exclusively that of the police department. The average number of messages transmitted during twenty-four hours was fifteen.

ELECTRIC LIGHTING BY ARC LAMPS.

In 1876 single carbon arc lamps were put into commercial use to a very limited extent. These first lamps were "non-series lamps", each requiring a separate circuit and a dynamo to maintain it in operation. In 1877 dynamos were constructed to supply current to two separate circuits, and hence two lamps could be operated by current from a single generator. Early in 1878 further modifications were made which rendered a single dynamo capable of supplying current to four separate circuits and thus maintaining four lamps in operation.

THE BRUSH SYSTEM.—In October, 1878, a decided impetus was given to arc lighting by Mr. Charles F. Brush, who invented "series" arc lamps which are adapted to be placed in circuit upon a single wire, like beads on a string, so that a number may be operated by the current furnished by a single dynamo. Series arc lamps, which at the outset were single carbon lamps, were quickly adopted and went into extensive commercial use in 1879. These lamps were used in the Riverside Mills, Providence, Rhode Island, in the fall of 1878. The Brush Electric Company of Cleveland, Ohio, was the first to manufacture "series arc lamps".

The first double carbon series arc lamp that was adapted for commercial use was also invented by Mr. Brush, and patented by him September 2, 1879. Its manufacture was commenced by the Brush Electric Company of Cleveland, Ohio, in the same year.

The first central electric lighting station using arc lamps was installed by the California Electric Light Company, of San Francisco, California, in 1879, and the Brush system was used.

THE THOMSON-HOUSTON SYSTEM.—The first Thomson-Houston series arc dynamo was developed early in 1879, and series arc lamps of this system were operated in Philadelphia in the summer of that year. Automatic regulators, for shifting the brushes on the commutator so as to automatically preserve a constant current when one or more of the series of lamps were in operation, was added to the system in 1880.

The American Electric Company (afterward the Thomson-Houston Electric Company) was organized about the middle of 1880, and began business in New Britain, Connecticut, at first devoting itself entirely to series arc lighting.

ELECTRIC LIGHTING BY INCANDESCENCE.

THE EDISON LIGHT.—In September, 1878, Mr. Thomas A. Edison began his experiments with a view to the production of an electric incandescent lamp which would have a life sufficient to permit of its commercial use, and in 1879 he completed his first lamp, using a platinum burner; this aroused great interest, but it was soon found that it required absolute uniformity of pressure, and in other respects did not realize his ideal; he, therefore, continued his work and was rewarded October 21, 1879, with the discovery that the difficulties of the case were met by the use of a carbon filament of high resistance in a vacuum.

A commercially successful incandescent lamp was the result. This lamp was patented January 27, 1880, the application having been filed November 14, 1879. A patent on what is commonly known as the multiple-arc system was applied for on February 6, 1880. This patent covered a full and complete system of generating and distributing electric current for light, heat, and power. The Edison 3-wire system was invented in 1882, and patented in March, 1883.

In January, 1880, Mr. Edison publicly exhibited the lights in operation at Menlo Park, New Jersey, where he was then residing and conducting his researches. The plant had a capacity of something over 500 lights, and attracted visitors in large numbers. In January, 1881, The Edison Electric Light Company, which had been organized in October, 1878, during the experiments at Menlo Park, opened an office at No. 65 Fifth avenue, New York city, where an Edison lighting plant was established and kept on view for the accommodation of scientists and the curious. Here, also, were prepared the plans for a central station system for New York city. The manufacture of Edison generating apparatus by the Edison Machine Works, and of Edison lamps by the Edison Lamp Company, was inaugurated in the same year.

The steamer Jeanette (formerly the Pandora) left San Francisco, where she had been refitted by Mr. James Gordon Bennett for arctic exploration by way of Bering straits, July 8, 1879, under the command of Lieutenant George W. De Long, United States navy, with a crew of 31 men. She had been provided, through the generosity of Mr. Edison, with a small dynamo, somewhat less in capacity than the type afterward standardized for twenty-five 16-candle power lamps, and a few lamps which were used to a limited extent. This was one of the first Edison dynamos made for any purpose, and the first which was placed upon a seagoing vessel. It went down with the ill-fated ship in arctic seas.

The first incandescent lamps successfully applied to the permanent lighting of an ocean-going vessel were placed upon the steamship Columbia, of the Oregon Railway and Navigation Company, which was built at Chester, Pennsylvania, and there fitted with four Edison dynamos; three of these dynamos supplied the current for about 120 16-candle power lamps and for a search light of some 4,000 candle power. The fourth dynamo acted as an exciter for the field magnets of the other dynamos. The plant was started May 2, 1880, and the Columbia sailed from New York for Portland, Oregon, via Cape Horn, about May 20, 1880. The plant was described in the Scientific American of May 22. The ship arrived at Portland July 26, and the chief engineer reported that the electric light system had worked with entire satisfaction during the whole trip in all kinds of weather, the ordinary skill of the engine room being sufficient for the management of the dynamos and lamps. The latter were fitted with carbons mostly of paper and a few of oak fiber. These carbons proved short lived and liable to breakage by heavy shocks, and some of the earliest bamboo carbon lamps were placed in the sockets on the arrival of the steamer at Portland. This plant is still in operation substantially in the form first installed.

Early in 1880 the subject of isolated plants had been considered, and the Edison Company for isolated lighting was organized in October, 1881, to control this branch of the business.

The first isolated incandescent plant placed on land for the lighting of a business establishment consisted of one 25-light dynamo in the establishment of Hinds, Ketchum & Co., lithographers, 449 Water street, New York, installed in January, 1881; and the first mill plant was started in the woolen mill of Mr. James Harrison, Newburg, New York, about September 15, 1881. The first hotel lighted was the Blue Mountain house, in the Adirondacks, started in October, 1881. The plant consisted of two 25-light machines, with 230 100-volt and 102 50-volt lamps, of which 125 lamps were operated at one time. Here the first lamp was placed on an elevator car July 12, 1882. The first yacht lighted was that of Mr. James Gordon Bennett, the Namouna, early in 1882. The first theater lighted by an isolated incandescent plant in this country was the Bijou, in Boston; the plant was started December 12, 1882, with 650 lights. The first newspaper office to use the light was the New York Herald, March, 1882. The first theater lighted by electricity from a central station was the City Theater of Brockton, Massachusetts.

Reference has been made to plans formulated for central station work. It was intended to install the first station in New York city, and construction was begun at a site on Pearl street in the summer of 1881. Meanwhile, however, a company had been formed in Appleton, Wisconsin, and a franchise obtained for central station lighting; the work was so expeditiously done that Appleton won the honor of having the first electric central station in operation, the light being turned on August 20, 1882, two weeks ahead of the Pearl street (New York) station. The installation was on a small scale and very crude; the building, of frame, one story high, measured but 15 by 18 feet; the electrical apparatus was one dynamo, with a capacity of between 200 and 300 lights, and was run by water power; voltmeters and ammeters were not furnished, the current being regulated by the appearance of the lamps

in the station building, and in case of "trouble" the station was shut down and all hands proceeded to locate and repair damages. This initial station started while there was as yet no precedent for the lighting of houses, stores, and hotels exclusively by electricity.

The first central station operated with special reference to incandescent lighting on an extended scale was the Pearl street station, installed in 1882 with about 200 lamps connected, supplied by some 50 miles of conductors placed undergound. The completeness of the preliminary arrangements for the first comprehensive plant is illustrated by the fact that only on one occasion during the first half dozen years of its existence, and that for about three hours only, was there any failure of this station to supply current.

The station in Sunbury, Pennsylvania, which was completed July 4, 1883, was the first to operate under the Edison 3-wire system. The station building was a small frame structure containing separate rooms for engines, boilers, dynamos, and meters. The electrical equipment consisted of two dynamos having a capacity of about 500 lights, two primitive and unreliable pressure indicators, and 1-ampere meter on the neutral wire. The meters used to measure the current furnished to the individual customers were of the usual Edison electrolytic type.

The second 3-wire station was operated in Shamokin, Pennsylvania, in October, 1883. The building was of brick and relatively much larger and more commodious than any previously constructed for the purpose: the generating apparatus consisted of two dynamos with a total capacity of about 1,500 lights and an extra dynamo for emergencies.

The line construction in Sunbury and Shamokin was all of the overhead kind, but on October 1, 1883, the first underground 3-wire system was put into operation in Brockton, Massachusetts. The station was well adapted to the intended uses and was fitted up with appliances of the most approved form then known to the art. The electrical apparatus consisted of three dynamos with an aggregate capacity of about 1,000 16-candle power lights, although something less than 200 lamps were connected when the station was first started. Few changes in the installation have been found necessary save in the way of providing for extension of business.

The opening of these initial stations operated by the 3-wire system marked a noteworthy advance of the business and the system has been highly successful from the start.

The Edison "municipal system" was invented by Mr. Edison prior to October 2, 1884, and patented October 20, 1885. It was designed for lighting streets, tunnels, caves, mines, and localities remote from the generating station by incandescent lamps; in this system the lamps are placed in series and the potential is raised to a high degree, strictly 1,200 volts, which is applied to each of several circuits connected in multiple arc. The "municipal" lamp is a modification of the ordinary Edison lamp to meet the requirements of the conditions under which it is used, and operates uniformly at a pressure of 1 volt per candle power, with a current of about 3 amperes.

The first plant designed to use this system was installed at Lockport, New York. It was started in March, 1885, followed October 1 in that year by the plant at Portland, Maine, since which date many other plants have been installed in all sections of the country.

THE ALTERNATING CURRENT SYSTEM.—The manufacturing and installing of alternating current plants with transformers was begun in 1886, almost simultaneously, by the Thomson-Houston Electric Company and the Westinghouse Electric Company, and in 1887 a number of plants were in operation using alternating currents for distribution over considerable distances in incandescent lighting. The business of distribution by alternating currents has grown to large proportions since that time and is one of the most extended branches of electric industry.

In this connection it may be stated that probably the first self-exciting alternating current dynamo built in this country was exhibited by Professors Thomson and Houston at the Franklin Institute, Philadelphia, in the winter of 1878–1879. With this dynamo Professor Thomson carried out some experiments with transformers in multiple arc from the mains early in 1879, the transformers having closed iron magnetic circuits, and approximating in this respect the modern types of transformers.

ELECTRIC STREET RAILWAYS.

Electric street railways are the latest development in the evolution of tramways for urban passenger traffic. Horses constituted the original motive power used on such tramways. The principal methods of motive power now in use by street railways, and their relative economy, form the subject of investigation and report by the transportation division of the Census Office, and it is only necessary to state here that nearly one-fifth of the street railway companies in the United States are now operating their lines wholly or in part by electricity. That this development is of quite recent occurrence will be seen by the following data:

In 1884 the Bentley-Knight Company started an experimental electric street railway, used an underground conductor, and operated one car in Cleveland, Ohio. In 1885 the Baltimore Union Passenger Railway Company equipped the Baltimore and Hampden Branch of their road. They operated two miles of single track, commencing with two cars, which were afterward increased to four. They used the Daft system, middle rail conductor and track return.

In February, 1886, the Binghamton Electric Railway Company, Binghamton, New York, was organized and commenced operating a 5-mile road with 10 cars, using the Van Depoele overhead trolley system. Power was furnished by the Binghamton Gas and Electric Company. Motors of 10 and 15 horse power were used, being placed on the platforms of old horse cars. This road is the oldest in this country that has been operated continuously as an electric road since its first trial of electric motive power.

In 1888 the Sprague Company installed an electric equipment to operate the Union Passenger Railway in Richmond, Virginia. They used the overhead trolley wire, operated 13 miles of track, and had 20 cars in operation by the close of the first year.

TABULAR STATEMENTS FOR 1890.

For the purpose of systematic presentation, this report treats of the electrical industries under the following general heads and subdivisions:

Isolated electric lighting and power plants.
Steamboat electric lighting plants.
Central electric lighting and power stations.
- General statement of capital, income, and expenses.
- Details of income and expenses.
- Details relating to power.
- Details relating to incandescent lighting.
- Details relating to arc lighting.
- Voltage and ampereage of lamps.
- Details relating to stationary motor service.
- Classification, by character of power used, of 129 stations outside of New York city.
- Classification, by type of electrical plant, of 129 stations outside of New York city.
- Classification, by type of steam engine used, of 83 stations outside of New York city.
- Analysis of returns by selected groups of central electric stations.
- Street lighting by electric arc lamps.
- Street lighting by electric incandescent lamps.
- Accumulators or storage batteries used with lighting plants.

Electric street railways.
Electric welding.
Electric smelting.
Uses of electricity in medicine and surgery.
District messenger electrical call service.
Municipal police patrol telegraph service.
Municipal fire alarm telegraph service.

ISOLATED ELECTRIC LIGHTING AND POWER PLANTS.

In the reports of the Tenth Census no mention is made of isolated electric lighting and power plants. It appears from the current inquiry that the first isolated electric lighting plant in the state of New York was installed in 1876. Following this, one plant was installed in 1877, three in 1878, and two in 1879, making seven plants in operation at the beginning of the census year 1880. In effect, however, the entire development of isolated electric lighting and power plants embraced by this report occurred during the decade of 1880–1890. The development is shown in the following table, which states the number of plants installed annually from 1876 to May 31, 1890:

TABLE 1.—ISOLATED ELECTRIC PLANTS.

NUMBER INSTALLED EACH YEAR.

DIVISIONS.	Total.	YEAR.														
		1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	a1890
State of New York.....	650	1	1	3	2	13	19	18	24	37	48	71	116	89	131	77
City of New York.....	214	1	1	2	1	6	8	6	8	15	16	21	30	26	41	32
State (exclusive of city).....	436	.....	.....	1	1	7	11	12	16	22	32	50	86	63	90	45

a January 1 to May 31, 1890.

Table 2 exhibits the number of plants existing May 31, 1890, their cost when installed, the cost of additions made to the same, the estimated allowance for depreciation, the value in 1890, and the kilowatt capacity. It will be noticed that the allowance for depreciation exceeds the value of additions made. This should not be construed as indicating a short life for electrical apparatus, but rather as showing the reduction in the cost of manufacturing such apparatus in later years. The "cost when installed" is the price when bought. The value reported for 1890 is the amount for which the apparatus could have been replaced at that date.

TABLE 2.—NUMBER AND VALUE OF ISOLATED ELECTRIC PLANTS, MAY 31, 1890.

DIVISIONS.	Number of plants.	Total cost.	Cost when installed.	Cost of additions.	Allowance for depreciation.	Value, 1890.	Kilowatt capacity.
State of New York	650	$3,416,543	$2,978,337	$438,206	$449,219	$2,967,324	16,575.7
City of New York	214	1,715,950	1,578,793	137,157	242,293	1,473,657	7,970.7
State (exclusive of city)	436	1,700,593	1,399,544	301,049	206,926	1,493,667	8,605.0

The following table exhibits data relating to the motive power used, the method of transmitting the power, and the number of dynamos operated:

TABLE 3.—MOTIVE POWER, ISOLATED ELECTRIC PLANTS.

DIVISIONS.	STEAM.						WATER.					
	Independent engines.		Number of dynamos.	Method of transmitting power to dynamos.			Water wheels.		Number of dynamos.	Method of transmitting power to dynamos.		
	Number.	Horse power.		Number belted direct to independent engines.	Number belted to common line shaft.	Number belted to independent line shaft.	Number.	Horse power.		Number belted direct to water wheels.	Number belted to common line shaft.	Number belted to independent line shaft.
State of New York	408	19,852	1,059	599	393	67	10	315	21	5	4	12
City of New York	204	10,843	408	291	101	16	.....	.....	.....	.....	.....	.....
State (exclusive of city)	204	9,009	651	308	292	51	10	315	21	5	4	12

The following table relates to various classes of currents; also lamps and motors operated by such currents. The total number of dynamos of all classes is 1,080, and their total capacity is 16,575.7 kilowatts.

TABLE 4.—CLASSES OF CURRENTS AND LAMPS AND MOTORS OPERATED, ISOLATED ELECTRIC PLANTS.

CONTINUOUS.

DIVISIONS.	CONSTANT VOLTAGE—VARIABLE AMPEREAGE.						CONSTANT AMPEREAGE—VARIABLE VOLTAGE.						
	Number of dynamos.	Number of incandescent lamps.	Number of arc lamps.	Stationary motors.		Total kilowatt capacity of this class of dynamos.	Number of dynamos.	Number of incandescent lamps.	Number of arc lamps.		Stationary motors.		Total kilowatt capacity of this class of dynamos.
				Number.	Horse power.				Single.	Double.	Number.	Horse power.	
State of New York	823	224,756	530	453	1,135.3	14,167.6	a247	548	3,372	488	6	37	2,315.1
City of New York	312	122,825	289	359	308.0	7,174.6	92	33	979	162	1	2	740.3
State (exclusive of city)	511	101,931	241	94	827.3	6,993.0	155	515	2,393	326	5	35	1,574.8

ALTERNATING.

State of New York	6	3,625	.....	.....	.....	47.3	4	791	.....	.....	.....	.....	45.7
City of New York	2	1,575	.....	.....	.....	36.4	2	376	.....	.....	.....	.....	19.4
State (exclusive of city)	b4	2,050	.....	.....	.....	10.9	2	415	.....	.....	.....	.....	26.3

a Arc dynamos.

b Two of these dynamos are used for the execution of condemned criminals, and are 3 kilowatts capacity each.

The following table relates to that part of the equipment consisting of transformers, accumulators, and stationary motors. Table 6 relates to incandescent lamps in use; Table 7 relates to arc lamps in use, and Table 8 relates to the consumption of carbons.

TABLE 5.—TRANSFORMERS, ACCUMULATORS, AND STATIONARY MOTORS, ISOLATED ELECTRIC PLANTS.

DIVISIONS.	TRANSFORMERS, ALTERNATING CURRENT.		ACCUMULATORS.		STATIONARY MOTORS, CONTINUOUS CURRENT.						MOTORS CONNECTED AT ORIGINAL INSTALLATION OF PLANTS.	
	Number connected.	Number of incandescent lamps connected to transformers.	Number of cells in use.	Number of incandescent lamps connected directly to accumulators.	Total number of motors.	Total horse power.	Constant voltage.		Constant amperage.			
							Number connected.	Horse power.	Number connected.	Horse power.	Number.	Horse power.
State of New York	134	3,340	953	1,356	459	1,172.3	453	1,135.3	6	37	385	1,046.5
City of New York	18	585	531	911	360	310.0	359	308.0	1	2	324	280.0
State (exclusive of city)	116	2,755	422	445	99	862.3	94	827.3	5	35	61	766.5

TABLE 6.—INCANDESCENT LAMPS IN USE, ISOLATED ELECTRIC PLANTS.

DIVISIONS.	Number connected at original installation of plants.	NUMBER IN USE, 1890.			Number required per year for renewals.	Kilowatt capacity required for all incandescent lamps wired.	NUMBER OF LAMPS AT DIFFERENT VOLTAGES.			
		Total.	Connected on incandescent circuits.	Connected on arc circuits.			20 to 40 volts.	40 to 70 volts.	70 to 100 volts.	100 volts and over.
State of New York	188,663	229,720	229,322	398	169,131	11,807.1	365	2,003	27,177	200,175
City of New York	109,480	124,809	124,776	33	99,376	6,330.5	.....	118	7,202	117,489
State (exclusive of city)	79,183	104,911	104,546	365	69,755	5,476.6	365	1,885	19,975	82,686

TABLE 7.—ARC LAMPS IN USE, ISOLATED ELECTRIC PLANTS.

DIVISIONS.	SINGLE LAMPS.				DOUBLE LAMPS, 400 WATTS AND OVER.		Number connected on incandescent lamp circuits.	Total number of lamps in use, 1890.	Kilowatt capacity required for all lamps wired.
	Number connected at original installation of plant.	Number in use, 1890.			Number connected at original installation of plant.	Number in use, 1890.			
		Total.	Number under 400 watts.	Number 400 watts and over.					
State of New York	2,817	3,372	578	2,794	400	488	530	4,390	2,011.0
City of New York	889	979	40	939	115	162	289	1,430	639.6
State (exclusive of city)	1,928	2,393	538	1,855	285	326	241	2,960	1,371.4

TABLE 8.—CONSUMPTION OF CARBONS, ISOLATED ELECTRIC PLANTS.

DIVISIONS.	NUMBER OF CARBONS.		
	Total.	Plain.	Copper coated.
State of New York	1,339,992	440,415	899,577
City of New York	613,341	330,436	282,905
State (exclusive of city)	726,651	109,979	616,672

The following table exhibits the capacity in number of arc lamps of arc lighting plants; the capacity in number of incandescent lamps of incandescent lighting plants, and the capacity in arc and incandescent lamps, respectively, of the composite plants reported. Table 10 exhibits the kilowatt capacity of the various types of plant in comparison with their respective values; Table 11 exhibits the total surplus capacity of all dynamos installed; Table 12 relates to the average capacity of plants and apparatus, and Table 13 exhibits in comparison certain average values for various classes of plants.

TABLE 9.—LIGHTING CAPACITY OF ISOLATED ELECTRIC PLANTS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Arc lighting plants:			
Number of plants	85	29	56
Capacity in arc lamps and equivalents—number of lamps	2,894	998	1,896
Number of arc lamps on arc plants	2,697	961	1,736
Number of incandescent lamps on arc plants	398	a33	365
Equivalent number in arc lamps	123	33	90
Motors—horse power of motors on arc plants	37	2	35
Equivalent numbers in arc lamps	74	4	70
Incandescent lighting plants:			
Number of plants	521	173	348
Capacity in incandescent lamps and equivalents—number of lamps	223,714.4	119,267.6	104,446.8
Number of incandescent lamps on incandescent plants	205,620	116,338	89,282
Number of arc lights on incandescent plants	530	289	241
Equivalent number in incandescent lamps	4,240	2,312	1,928
Motors—horse power of motors on incandescent plants	1,135.3	308.0	827.3
Equivalent number in incandescent lamps	13,854.4	617.6	13,236.8
Composite plants:			
Number of plants	b42	12	b30
Number of arc lamps	1,693	469	1,224
Number of incandescent lamps	24,100	8,471	15,629
Motors—horse power	144.2	9.95	134.25

a Includes some very large incandescent lamps.

b In addition to this number there are 2 plants owned by the state of New York, installed for the purpose of capital punishment; these plants consist of 2 dynamos of 3 kilowatts capacity each, total value $5,868.

TABLE 10.—KILOWATT CAPACITY AND VALUE OF ISOLATED ELECTRIC PLANTS. (*a*)

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Arc lighting plants:			
Number of plants	85	29	56
Number of arc lamps	2,697	961	1,736
Kilowatt capacity	1,300.6	437.6	863
Value	$271,864	$80,789	$191,075
Incandescent lighting plants:			
Number of plants	521	173	348
Number of incandescent lamps	205,620	116,338	89,282
Kilowatt capacity	12,852.5	6,738.3	6,114.2
Value	$2,263,063	$1,275,402	$987,661
Composite plants:			
Number of plants	a42	12	a30
Total value	$426,529	$117,466	$309,063
Arc lighting			
Number of arc lamps	1,693	469	1,224
Kilowatt capacity	1,014.5	302.7	711.8
Proportionate value	$180,396	$44,737	$135,659
Incandescent lighting:			
Number of incandescent lamps	24,100	8,471	15,629
Kilowatt capacity	1,402.1	492.1	910
Proportionate value	$246,133	$72,729	$173,404

a Not including 2 dynamos of 3 kilowatts capacity each, used for the execution of condemned criminals.

TABLE 11.—SURPLUS DYNAMO CAPACITY OF ISOLATED ELECTRIC PLANTS. (a)

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Total kilowatt capacity of all incandescent dynamos in use	14,254.60	7,230.40	7,024.20
Total kilowatts required for all incandescent lamps and equivalents in use	13,101.90	6,741.70	6,360.20
Surplus dynamo capacity (kilowatts)	1,152.70	488.70	664.00
Percentage of incandescent dynamo capacity not in use	8.09	6.76	9.45
Total kilowatt capacity of all arc dynamos in use	2,315.10	740.30	1,574.80
Total kilowatts required for all arc lamps and equivalents in use	1,890.10	539.50	1,350.60
Surplus dynamo capacity (kilowatts)	425.00	200.80	224.20
Percentage of arc dynamo capacity not in use	18.36	27.12	14.24

a Not including 2 dynamos of 3 kilowatts capacity each, used for the execution of condemned criminals.

TABLE 12.—AVERAGE CAPACITIES OF APPARATUS, ISOLATED ELECTRIC PLANTS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Average horse power per independent engine	48.66	53.15	44.16
Average number of arc lamps per plant (arc and composite plants)	30.39	27.83	31.62
Average kilowatt capacity (arc plants)	15.30	15.09	15.41
Average number of incandescent lamps per plant (incandescent and composite plants)	407.32	674.46	276.58
Average kilowatt capacity (incandescent plants)	24.66	38.95	17.55
Average number of arc lamps per dynamo	16.43	12.80	18.57
Average number of incandescent lamps per dynamo	297.50	404.24	232.25
Average kilowatt capacity per dynamo of all dynamos	15.35	19.54	12.81

TABLE 13.—COMPARISON OF AVERAGE VALUES, ISOLATED ELECTRIC PLANTS.

CHARACTER OF VALUE.	Total for state.	City of New York.	State of New York (exclusive of city).
Average value of plant:			
Per arc plant	$3,198.40	$2,785.83	$3,412.05
Per incandescent plant	4,343.69	7,372.27	2,838.11
Per composite plant	10,155.45	9,788.83	10,302.10
Average value of plant per kilowatt capacity:			
Arc plants, value per kilowatt	209.03	184.62	221.41
Incandescent plants, value per kilowatt	176.08	189.28	161.54
Composite plants, value per kilowatt	176.50	147.79	190.57
Average value of plant per lamp:			
Per arc lamp and equivalents	111.48	106.56	113.49
Per incandescent lamp and equivalents	10.13	10.55	9.67

STEAMBOAT ELECTRIC LIGHTING PLANTS.

There were 57 steamboats reported as having electric lighting plants June 30, 1890. Table 14 shows the construction of these boats, their tonnage, and the nature of their traffic; present value of their electric lighting plants and the characteristics of same; the number of incandescent lamps required for renewals and the number of arc lamp carbons consumed in a year.

TABLE 14.—STEAMBOATS—ELECTRIC LIGHTING PLANTS.

Number reported	57
Construction:	
Number made of iron	23
Number made of steel	13
Number made of wood	19
Number of composite	2
Tonnage	186,846
Nature of traffic:	
Freight	2
Passenger	35
Freight and passenger	20
Value of lighting plants	$135,638
Number of engines for operation of dynamos	62
Horse power of engines	1,132
Dynamos:	
Total number	64
Incandescent lamp dynamos	54
Arc lamp dynamos	10
Kilowatt capacity of all dynamos	517.3
Arc lamps:	
Number of arc lamps	71
Number of arc search lights	8
Incandescent lamps:	
Number of incandescent lamps	6,449
Number of incandescent search lights	2
Number of incandescent lamps required for renewals	4,642
Arc lamp carbons consumed	21,112
Plain	18,712
Coppered	2,400
Arc lamps operated on incandescent circuits	6

CENTRAL ELECTRIC LIGHTING AND POWER STATIONS.

This report includes returns from 10 stations in the city of New York and 129 stations in the state of New York outside of the city of New York, making a total of 139 stations in the state.

In the following tables the figures for the 10 stations in New York city, and for the 129 stations in the state outside of the city, are presented separately, and the figures for the 139 stations in the state, considered as a whole, are presented in a column giving totals.

Table 15 illustrates the origin and growth of central electric lighting and power stations, on the basis of the number of stations installed each year.

TABLE 15.—CENTRAL ELECTRIC STATIONS.

NUMBER INSTALLED EACH YEAR.

DIVISIONS.	Total.	YEAR.									
		1881	1882	1883	1884	1885	1886	1887	1888	1889	a1890
State of New York	139	7	2	3	3	13	14	33	31	25	8
City of New York	10	2	.....	.....	1	.....	1	2	2	2	.....
State (exclusive of city)	129	5	2	3	2	13	13	31	29	23	8

a January 1 to May 31, 1890.

Table 16 shows (1) number of establishments and persons in interest; (2) capital employed, value of hired property, also a statement showing how the capital is invested in fixed and live assets; (3) liabilities, or how the invested capital is owned, under the subheadings of personal investment, investments by gaslight companies, capital stock paid in incorporated electric light and power companies, surplus fund, undivided profits, bonds payable, bills and accounts payable and other credits; (4) income, total, and under the subheads of income from arc and incandescent lighting, electric power service, and sundry sources; (5) operating expenses, shown under the subheads of wages paid, materials used, and miscellaneous expenses not including depreciation of plant.

The statement showing capital investments and liabilities, or how the capital invested is owned, are aggregates of the respective accounts as kept by the companies, firms, or persons reporting, and it may be noted that these accounts show for surplus fund and undivided profits for the 10 stations in New York city $1,592,404; for the 129 stations in the state outside the city of New York $653,949, making a total for the 139 stations in the state of New York of $2,246,353. The fact should be kept clearly in mind that these amounts of surplus fund and undivided profits represent accumulations during the entire time the stations reported have been in operation. They are the balances of these accounts brought forward from year to year, and do not represent net earnings or profits for any single year.

TABLE 16.—STATEMENT OF CAPITAL, INCOME, AND EXPENSES, CENTRAL ELECTRIC STATIONS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Number of establishments (*a*)	139	10	129
Character of ownership:			
Personal	27	.....	27
Gaslight companies	9	.....	9
Incorporated electric light and power companies	103	10	93
Number of shareholders	3,369	857	2,512
Number residing in state of New York	3,084	751	2,333
Number residing in other states	285	106	179
Number of male shareholders	2,964	788	2,176
Number of female shareholders	405	69	336
Capital:			
Value of hired property	$1,030,355	$633,050	$397,305
Aggregate of direct investment	$30,153,263	$15,995,500	$14,157,763
Plant—total	17,133,011	7,440,531	9,692,480
Land	1,612,017	820,884	791,133
Buildings	1,830,918	703,984	1,126,934
Office fixtures and furniture	32,589	12,614	19,975
Steam or water power plant and its accessories	2,699,778	933,923	1,765,855
Electric plant within station and its accessories	3,095,848	1,069,421	2,026,427
Underground electric service construction	3,043,363	2,457,007	586,356
Aerial electric service construction	2,640,812	713,707	1,927,105
Lamps, motors, meters, and converters wired for use	2,177,686	728,991	1,448,695
Live assets—total	13,020,252	8,554,969	4,465,283
Lamps, globes, carbons, and wire in stock	252,345	95,429	156,916
Motors, meters, and converters in stock	191,275	147,001	44,274
Patent rights	11,076,567	7,642,114	3,434,453
Sundry supplies	132,518	23,522	108,996
Cash, bills receivable, accounts due, and sundries	1,367,547	646,903	720,644
Liabilities—total	30,153,263	15,995,500	14,157,763
Personal investment	603,553	.....	603,553
Investment by gaslight companies	291,353	.....	291,353
Capital stock paid in incorporated electric light and power companies	18,042,811	8,917,800	9,125,011
Surplus fund	1,655,625	1,272,503	383,122
Undivided profits	590,728	319,901	270,827
Bonds payable	6,679,713	4,410,000	2,269,713
Bills and accounts payable and all other credits	2,289,480	1,075,296	1,214,184
Income—total	4,174,534	1,565,074	2,609,460
From arc and incandescent lighting	3,858,208	1,362,595	2,495,613
From power	192,754	125,474	67,280
From sundries	123,572	77,005	46,567
Expenses—total	3,077,625	1,446,330	1,631,295
Wages	1,375,861	662,787	713,074
Materials used	981,636	345,664	635,972
Miscellaneous expenses (*b*)	720,128	437,879	282,249

a Does not include 1 central station operated by the municipality of Dunkirk, New York.
b Does not include depreciation of plant.

The statement of income and expenses presented in the table on the following page covers the operations of each station for one year, the accounts being made for a period corresponding as nearly as possible with the Eleventh Census year, June 1, 1889, to May 31, 1890. An examination of the statement will disclose the fact that interest on capital invested, depreciation on value of buildings, machinery and line construction, and cost of collecting rentals have not been calculated nor included in any of the items showing cost of operation.

The data presented can not, therefore, be considered as showing net profits or earnings, such a statement not being properly within the scope of this inquiry.

TABLE 17.—INCOME AND EXPENSES IN DETAIL, CENTRAL ELECTRIC STATIONS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Income—aggregate	$4,174,534	$1,565,074	$2,609,460
From arc lighting, single carbon lamps—total receipts	$812,891	$267,563	$545,328
Total number single carbon lamps	8,846	1,880	6,966
Residence lighting, number of lamps	2	.....	2
Annual income	$64	.....	$64
Commercial lighting, number of lamps	6,764	1,880	4,884
Annual income	$634,704	$267,563	$367,141
Municipal lighting, number of lamps	2,080	.....	2,080
Annual income	$178,123	.....	$178,123
From arc lighting, double carbon lamps—total receipts	$1,459,483	$352,412	$1,107,071
Total number of double carbon lamps	10,988	2,039	8,949
Commercial lighting, number of lamps	2,119	1,134	985
Annual income	$317,042	$222,451	$94,591
Municipal lighting, number of lamps	8,869	905	7,964
Annual income	$1,142,441	$129,961	$1,012,480
From incandescent lamp lighting—total receipts	$1,585,834	$742,620	$843,214
Total (theoretical) number of incandescent lamps (*a*)	286,935	123,204	163,731
Residence lighting, number of lamps	16,952	.....	16,952
Annual income	$47,515	.....	$47,515
Commercial lighting, number of lamps	264,037	123,204	140,833
Annual income	$1,474,801	$742,620	$732,181
Municipal lighting, number of lamps	5,946	.....	5,946
Annual income	$63,518	.....	$63,518
From power—total receipts	$192,754	$125,474	$67,280
Number of stationary motors	2,363	1,185	1,178
Horse power	2,954	1,678	1,276
Annual income	$185,205	$125,474	$59,731
Number of electric locomotives	20	.....	20
Horse power	180	.....	180
Annual income	$7,549	.....	$7,549
From sundries—total receipts	$123,572	$77,005	$46,567
Expenses—aggregate	$3,077,625	$1,446,330	$1,631,295
Total wages	$1,375,861	$662,787	$713,074
Average number of employés	1,753	723	1,030
Males above 16 years	1,747	722	1,025
Females above 15 years	6	1	5
Materials used—total cost	$981,036	$345,664	$635,972
Fuel	513,794	168,597	345,197
Water	40,976	15,062	25,914
Incandescent lamp renewals	118,555	48,920	69,635
Arc lamp carbons	108,986	23,975	85,011
Arc lamp globes	12,197	5,028	7,169
Sundry supplies	187,128	84,082	103,046
Miscellaneous expenses—total (*b*)	$720,128	$437,879	$282,249
Rent	80,627	50,644	29,983
Insurance	57,020	27,359	29,661
Taxes	114,502	50,625	63,877
Rentals for poles and other supports	9,132	575	8,557
Rentals for conduits or other underground privileges	174,889	173,970	919
Repairs, ordinary, of buildings and machinery	152,313	47,787	104,526
Contingencies and sundries	131,645	86,919	44,726

a On 16-candle power basis.

b Does not include depreciation of plant.

The following table shows details relating to steam and water power plants, respectively; dynamos and line construction; fuel and arc lamp carbons consumed, and incandescent lamps required for renewals:

TABLE 18.—PLANT AND MATERIALS USED—CENTRAL ELECTRIC STATIONS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Power plant:			
Boilers, number	368	86	282
Horse power capacity	47,895	15,972	31,923
Total horse power capacity of plant, nominal rating	59,512	16,670	42,842
Engines, number	330	61	269
Horse power capacity, nominal rating	47,432	16,670	30,762
Water wheels, number	74	.....	74
Horse power capacity, nominal rating	12,080	.....	12,080
Electric plant in station:			
Dynamos, number	1,264	384	880
Kilowatt capacity of dynamos	31,383	11,798	19,585
Dynamos, continuous current, number	1,074	338	736
Constant voltage, variable ampereage	329	103	226
Variable voltage, constant ampereage	745	235	510
Dynamos, alternating current, number	189	46	143
Constant voltage, variable ampereage	177	46	131
Variable voltage, constant ampereage	12	.....	12
Dynamos of other types, number	1	.....	1
Station instruments in use, number	5,152	1,446	3,706
Line construction:			
Total mileage of all conductors	10,673.6	5,899.9	4,773.7
Conductors, total number	1,358	356	1,002
Underground conductors, number	136	90	46
Mileage of underground conductors	671.1	546.6	124.5
Conductors, part underground, part aerial, number	136	136	.....
Mileage	4,586	4,586	.....
Aerial conductors, number	1,086	130	956
Mileage	5,416.5	767.3	4,649.2
Fuel used:			
Total cost	$513,794	$168,597	$345,197
Anthracite coal, tons used	112,576	52,701	59,875
Cost	$322,941	$143,537	$179,404
Semibituminous coal, tons used	3,070	.....	3,070
Cost	$5,963	.....	$5,963
Bituminous coal, tons used	64,347	6,950	57,397
Cost	$178,761	$25,060	$153,701
Natural gas, cost	$4,425	.....	$4,425
Other fuel, cost	$1,704	.....	$1,704
Arc lamp carbons:			
Total cost	$108,986	$23,975	$85,011
Total number of carbons consumed	10,417,217	2,282,038	8,135,179
Plain carbons consumed, number	1,491,388	139,894	1,351,494
Coppered carbons consumed, number	8,925,829	2,142,144	6,783,685
Incandescent lamp renewals:			
Total cost	$118,555	$48,920	$69,635
Number	214,137	95,160	118,977

The following table shows details of income from incandescent lighting, based on meter and contract charges and municipal lighting service, the character of currents employed, the system of wiring, also the number of lamps connected of the different candle power:

TABLE 19.—INCANDESCENT LIGHTING IN DETAIL, CENTRAL ELECTRIC STATIONS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Incandescent lighting:			
Incandescent lamps—total number (*a*)	286,935	123,204	163,731
Total income	$1,585,834	$742,620	$843,214
Residence lighting:			
Meter service, number of lamps (*a*)	9,965	.....	9,965
Annual income	$26,627	.....	$26,627
Contract service, number of lamps (*a*)	6,987	.....	6,987
Annual income	$20,888	.....	$20,888
Municipal lighting:			
Contract service, number of lamps (*a*)	5,946	.....	5,946
Annual income	$63,518	.....	$63,518
Commercial lighting:			
Meter service, number of lamps (*a*)	173,279	116,679	56,600
Annual income	$887,330	$694,695	$192,635
Contract service, number of lamps (*a*)	90,758	6,525	84,233
Annual income	$587,471	$47,925	$539,546
Classification of incandescent lamps:			
10 candle power, number of lamps (*b*)	8,806	.....	8,806
16 candle power, number of lamps (*b*)	244,939	122,651	122,288
20 candle power, number of lamps (*b*)	9,724	.....	9,724
24 candle power, number of lamps (*b*)	3,982	.....	3,982
32 candle power, number of lamps (*b*)	4,177	225	3,952
50 candle power, number of lamps (*b*)	1,595	3	1,592
65 candle power, number of lamps (*b*)	278	.....	278
75 candle power, number of lamps (*b*)	28	.....	28
100 candle power, number of lamps (*b*)	274	.....	274
150 candle power, number of lamps (*b*)	219	10	209
Character of current:			
Primary continuous, number of lamps	136,707	69,000	67,707
Primary alternating, number of lamps	3,402	.....	3,402
Secondary alternating, number of lamps	133,913	53,889	80,024
System of wiring:			
Multiple, number of lamps	160,510	58,889	101,621
Series multiple, number of lamps	730	.....	730
Series, number of lamps	1,072	.....	1,072
Multiple series, number of lamps	6,891	.....	6,891
3-wire, number of lamps	103,173	64,000	39,173
On arc lamp circuits, number of lamps	1,646	.....	1,646

a Theoretical number of lamps computed on basis of 16 candle power unit.

b Actual number of lamps classified according to power.

The following table shows details of system for hanging arc lamps used for street lighting, the character of currents, system of wiring, and total number of arc lamps connected:

TABLE 20.—ARC LIGHTING IN DETAIL, CENTRAL ELECTRIC STATIONS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Arc lamp service, street and commercial lighting:			
Single carbon lamps—total number	8,846	1,880	6,966
Character of current:			
Primary continuous	8,769	1,880	6,889
Primary alternating	77	.....	77
System of wiring:			
Series, number of lamps	7,775	1,626	6,149
Multiple, on incandescent lamp circuits, number of lamps	217	.....	217
3-wire, on incandescent lamp circuits, number of lamps	854	254	600
Double carbon lamps—total number	10,988	2,039	8,949
Character of current:			
Primary continuous, number of lamps	10,988	2,039	8,949
Wiring system:			
Series, number of lamps	10,988	2,039	8,949
System for hanging arc lamps for street lighting:			
Single carbon lamps—total number	2,080	.....	2,080
Number on poles	507	.....	507
Number on mast arms	168	.....	168
Number over street center	1,405	.....	1,405
Double carbon lamps, total number	8,869	905	7,964
Number on poles	4,140	892	3,248
Number on mast arms	2,435	13	2,422
Number over street center	2,232	.....	2,232
Number on towers	62	.....	62

The following table shows details of voltage and ampereage of arc lamps and the voltage of incandescent lamps, giving the number of lamps connected on the respective currents, specified by commercial rating:

TABLE 21.—VOLTAGE AND AMPEREAGE OF LAMPS, CENTRAL ELECTRIC STATIONS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Arc lamps:			
Single carbon lamps—total number	8,846	1,880	6,966
20 volts, 23 amperes	16	.....	16
30 volts, 18 amperes	25	25	.....
30 volts, 20 amperes	206	.....	206
45 volts, 6.8 amperes	875	41	834
45 volts, 8 amperes	6	.....	6
45 volts, 9 amperes	30	.....	30
45 volts, 9.6 amperes	832	.....	832
45 volts, 10 amperes	1,418	440	978
46 volts, 6.8 amperes	1,058	.....	1,058
48 volts, 6.8 amperes	61	.....	61
48 volts, 9.6 amperes	30	.....	30
48 volts, 10 amperes	210	.....	210
50 volts, 6.8 amperes	833	.....	833
50 volts, 8 amperes	602	2	600
50 volts, 9 amperes	240	.....	240
50 volts, 9.6 amperes	1,429	1,118	311
50 volts, 10 amperes	673	.....	673
52 volts, 8 amperes	48	.....	48
55 volts, 8 amperes	254	254	.....
Double carbon lamps—total number	10,988	2,039	8,949
25 volts, 20 amperes	308	.....	308
30 volts, 18 amperes	809	809	.....
30 volts, 20 amperes	484	.....	484
35 volts, 22 amperes	85	85	.....
45 volts, 6.8 amperes	381	.....	381
45 volts, 9 amperes	116	.....	116
45 volts, 9.6 amperes	2,415	.....	2,415
45 volts, 10 amperes	1,551	385	1,166
46 volts, 6.8 amperes	1,285	.....	1,285
48 volts, 6.8 amperes	20	.....	20
48 volts, 9.6 amperes	30	.....	30
48 volts, 10 amperes	444	.....	444
50 volts, 6.8 amperes	653	.....	653
50 volts, 9 amperes	220	.....	220
50 volts, 9.6 amperes	1,264	760	504
50 volts, 10 amperes	863	.....	863
Incandescent lamps—total number	274,022	122,889	151,133
Less than 40 volts	4,065	.....	4,065
40 and less than 70 volts	114,102	36,889	77,213
70 and less than 100 volts	9,669	7,000	2,669
100 volts and over	146,186	79,000	67,186

The following table presents details for stationary motor service, showing number of motors and total horse power; income, meter, and contract charges; character of currents; systems of wiring; also the capacity, number, and location of converters connected:

TABLE 22.—DETAILS RELATING TO STATIONARY MOTOR SERVICE, CENTRAL ELECTRIC STATIONS.

ITEMS.	Total for state.	City of New York.	State of New York (exclusive of city).
Stationary motors—total number of motors	2,363	1,185	1,178
Horse power, total	2,954	1,678	1,276
Income—total	$185,205	$125,474	$59,731
Meter charges, number of motors	668	600	68
Annual income	$67,550	$60,000	$7,550
Contract charges, number of motors	1,695	585	1,110
Annual income	$117,655	$65,474	$52,181
Character of current:			
Primary continuous—			
Constant voltage, number of motors	1,428	1,158	270
Constant amperage, number of motors	901	27	874
Secondary alternating, number of motors	34	.....	34
System of wiring:			
Primary current—number of motors	2,329	1,185	1,144
Multiple, number of motors	669	558	111
Horse power of motors connected	1,456	951	505
Series, number of motors	972	27	945
Horse power of motors connected	512	30	482
3-wire, number of motors connected	688	600	88
Horse power of motors connected	948	697	251
Secondary current:			
Multiple, number of motors connected	34	.....	34
Horse power of motors connected	38	.....	38
Converters:			
Amperage capacity of all converters connected	129,896	54,200	75,696
Total number converters	7,282	2,544	4,738
5 amperes, number	387	.....	387
10 amperes, number	1,728	1,025	703
15 amperes, number	488	.....	488
20 amperes, number	1,336	760	576
25 amperes, number	338	.....	338
30 amperes, number	686	470	216
40 amperes, number	817	205	612
50 amperes, number	70	52	18
75 amperes, number	68	.....	68
100 amperes, number	30	19	11
150 amperes, number	13	13	.....
Number of street converters	1,321	.....	1,321
Location of converters:			
Number on poles	1,826	.....	1,826
Number outside buildings	5,422	2,544	2,878
Number inside buildings	34	.....	34

In the following table data relating to 129 stations located outside the city of New York are classified by character of power used, and percentages obtained from the totals shown are presented for the respective types of station:

TABLE 23.—CLASSIFICATION, BY CHARACTER OF POWER USED, OF 129 CENTRAL ELECTRIC STATIONS OUTSIDE OF NEW YORK CITY.

ITEMS.	Total.	Steam.	Water.	Steam and water.	Power hired.
Number of stations	129	88	13	13	15
Value of entire plant, direct investment	a$9,736,754	$7,215,445	$1,407,279	$866,182	$247,848
Average value of entire plant per station	$75,479	$81,994	$108,252	$66,629	$16,523
Gross income	$2,609,460	$2,016,012	$306,465	$168,669	$118,314
Gross expense (b)	$1,631,295	$1,310,082	$151,768	$116,083	$53,362
Net operating income (b)	$978,165	$705,930	$154,697	$52,586	$64,952
Value of power plant	$1,765,855	$1,390,099	$194,001	$173,123	$8,632
Average value of power plant per station	$13,689	$15,797	$14,923	$13,317	$575
Expense of power plant	$615,176	$550,909	$8,494	$40,143	$15,630
Wages	$178,171	$161,515	$5,450	$8,012	$3,194
All other expenses	$437,005	$389,394	$3,044	$32,131	$12,436
Power—total horse power	42,842	26,787	9,521	5,699	835
Steam horse power	30,762	26,787	c905	2,685	385
Water horse power	12,080		8,616	3,014	450
Percentage:					
Gross income on value of entire plant	26.80	27.94	21.78	19.47	47.74
Gross expense on value of entire plant	16.75	18.16	10.78	13.40	21.53
Gross expense of gross income	62.51	64.98	49.52	68.82	45.10
Net income on value of entire plant (b)	10.05	9.78	10.99	6.07	26.21
Value of power plant on value of entire plant	18.14	19.27	13.79	19.99	3.48
Labor on power plant of gross expense	10.92	12.33	3.59	6.90	5.99
Incidental power expense of gross expense	26.79	29.72	2.01	27.68	23.30
Total power expense of gross expense	37.71	42.05	5.60	34.58	29.29

a The item "motors, meters, and converters" ($44,274) is included in this amount.

b In this computation charges for depreciation have not been included.

c Stations using water power exclusively have 905 horse power in steam engines installed to be used in case of emergency. There is no record of the use of these engines.

In the following table data relating to 129 stations located outside the city of New York are classified by types of electrical plant, and percentages obtained from the totals shown are presented for the respective groups:

TABLE 24.—CLASSIFICATION, BY TYPE OF ELECTRICAL PLANT, OF 129 CENTRAL STATIONS OUTSIDE OF NEW YORK CITY.

ITEMS.	Total.	Arc.	INCANDESCENT.		COMPOSITE.		
			Continuous current.	Alternating current.	Arc and incandescent.	Arc and series incandescent.	Incandescent with arcs on incandescent circuits.
Number of stations	129	17	8	9	75	15	5
Total value of entire plant, direct investment (*a*)	$9,736,754	$983,731	$149,326	$211,403	$6,389,268	$820,498	$1,173,528
Total capacity of plant in kilowatts	19,585	1,659.8	565.9	627.7	13,732.5	1,420.1	1,579
Electrical apparatus and lines, value	$5,988,583	$534,044	$95,975	$150,774	$3,954,416	$474,107	$779,267
Income—total	$2,609,460	$276,275	$51,469	$83,421	$1,680,466	$411,440	*b*$106,389
Arc lighting	1,652,399	268,375	.....	.....	1,006,432	362,642	14,950
Incandescent lighting	843,214	.....	33,961	83,259	603,146	40,637	82,211
Motors	67,280	4,439	1,403	.....	48,862	3,348	9,228
Miscellaneous	46,567	3,461	16,105	162	22,026	4,813	.....
Operating expenses—total (*c*)	$1,631,295	$170,123	$37,908	$48,238	$1,009,229	$223,704	$82,093
Electrical plant—							
Office expenses	$141,325	$17,994	$1,512	$4,546	$81,646	$26,887	$8,746
Wages	$452,916	$46,180	$10,050	$9,356	$289,371	$72,084	$24,975
Incidental expenses	$325,257	$37,052	$5,625	$11,644	$210,767	$40,712	$19,457
Percentage:							
Of total value of each type of plant	100.00	10.10	1.54	2.17	65.62	8.52	12.05
Of total income of each type of plant	100.00	10.59	1.97	3.19	64.40	15.77	4.08
Operating expenses of income	.....	61.58	73.65	57.82	63.63	54.37	77.16
Electrical apparatus and lines of total value of plant	.....	54.29	64.27	71.32	61.89	57.16	66.40
Office expenses of total operating expenses	.....	10.58	3.99	9.41	7.64	12.02	10.05
Electrical plant labor of total expense	.....	27.15	28.89	19.40	27.06	32.22	30.42
Electrical plant incidental expense of total expense	.....	21.78	14.84	24.14	19.71	18.20	23.70
Averages:							
Value of plant per station	$75,479	$57,867	$18,666	$23,489	$85,190	$55,300	$234,706
Value of plant per kilowatt of capacity	$497	$593	$264	$337	$465	$584	*d*$743

a The item "motors, meters, and converters" ($44,274) is included in this amount.
b One large plant had run but one year and its income was not fully developed.
c Does not include depreciation of plant.
d Includes expensive underground conductors.

In the following table are presented certain data reported for 83 central electric lighting and power stations located outside the city of New York and using steam power exclusively. These data are classified according to the speed of the engines furnishing power for dynamos. The distribution is made in two groups: the one using engines running 150 revolutions or more per minute is classed as "fast running", and the other group, using engines running less than 150 revolutions per minute, is classed as "slow running".

TABLE 25.—CLASSIFICATION, BY TYPE OF STEAM ENGINE USED, OF 83 CENTRAL ELECTRIC STATIONS OUTSIDE OF NEW YORK CITY.

ITEMS.	Total.	TYPE OF STEAM ENGINES FURNISHING POWER TO DYNAMOS.	
		Fast running. (a)	Slow running. (b)
Number of stations	83	68	15
Total value of entire plant, direct investment	$7,129,283	$4,209,185	$2,920,098
Steam power plant, value	$1,383,099	$753,172	$629,927
Horse power of engine, nominal rating	26,357	14,405	11,952
Income—total	$1,986,436	$910,308	$1,076,128
Operating expenses (not including depreciation of plant)—total	$1,286,257	$701,467	$584,790
Cost of power—total	$560,662	$338,406	$222,256
Fuel (c)	336,852	215,451	121,401
Wages	159,049	87,793	71,256
Incidental expenses	64,761	35,162	29,599
Percentages:			
Value of steam power plant of value of total plant		17.89	21.57
Operating expense of total income		77.06	54.34
Total cost of power of total expense		48.24	38.01
Fuel of total expense		30.71	20.76
Wages of total expense		12.52	12.19
Incidental expense of total expense		5.01	5.06

a The fast engines are as follows: simple fast, 49; simple condensing fast, 3; compound condensing fast, 7; compound noncondensing fast, 1; simple fast and compound condensing fast, 5; simple fast and compound noncondensing fast, 3.

b The slow engines are as follows: simple condensing slow, 5; compound condensing slow, 1; simple fast and slow, 5; simple fast and compound condensing slow, 4; simple fast, condensing slow compound condensing slow, 2; simple slow, compound condensing fast, 1; condensing slow, noncondensing slow compound noncondensing slow, 1.

c The item of fuel includes 112,676 tons of coal at an average cost of $2.76 per ton delivered at power plant; 68 plants, having a total of 14,405 nominal horse power of "fast-running" engines used 76,044 tons of coal, or 5.28 tons of coal per horse power; 15 plants having a total of 11,952 nominal horse power of "slow-running" engines, used 36,632 tons of coal, or 3.06 tons per horse power.

In the following table the amounts of stock and bond investment are shown, respectively, for all central electric lighting and power stations in the state of New York outside the city of New York; also the gross income, the various sources from which it was derived, and the amount derived from each source, the various expenses of operation, and the respective amounts and their percentage of the total operating expense:

TABLE **26.**—INVESTMENT, INCOME, AND OPERATING EXPENSES FOR ALL (129) CENTRAL ELECTRIC STATIONS IN THE STATE OF NEW YORK OUTSIDE THE CITY OF NEW YORK.

ITEMS.	Total.	Per cent of total.
Capital stock and bond investment	$12, 289, 630	100.00
Individual and share capital stock investment	10, 019, 917	81.53
Bond investment	2, 269, 713	18.47
Income	2, 609, 460	100.00
Arc lighting	1, 652, 399	63.32
Incandescent lighting	843, 214	32.31
Power	67, 280	2.58
Sundries	46, 567	1.79
Operating expenses, exclusive of depreciation of plant	1, 631, 295	100.00
Rent of buildings and land	29, 983	1.84
Insurance	29, 661	1.82
Taxes	63, 877	3.92
Wages	713, 074	43.71
Fuel	345, 197	21.16
Water	25, 914	1.59
Incandescent lamp renewals	69, 635	4.27
Carbons	85, 011	5.21
Globes	7, 169	0.44
Rent of poles, etc	8, 557	0.52
Rent of conduits	919	0.06
Supplies	207, 572	12.72
Contingencies	44, 726	2.74

ANALYSIS OF RETURNS FROM SELECTED GROUPS OF CENTRAL ELECTRIC STATIONS.

As a guide to the results of the electrical engineering practices of the day, stations having corresponding characteristics are grouped, and the following table shows their combined capital stock and bond investment, income, operating expense and operating income, the per cent of total income represented by each of the several sources of income, the per cent of total expense represented by each of the various items of expense, the output computed in arc lamp hours, income and expense of each class of service, operating income of each service, and the operating income of each service per arc lamp hour:

TABLE 27.—STATEMENT BY GROUP TOTALS FOR 13 SELECTED COMPOSITE STATIONS AND ANALYSIS OF DATA.

ITEMS.	GROUP I. Ten composite stations using arc lamps 400 watts and over. (a)						GROUP II. Three composite stations using arc lamps less than 400 watts. (b)	
	Combination of six stations using steam power and four stations using water power.		Six stations using steam power.		Four stations using water power.			
	Amount.	Per cent of total.	Amount.	Per cent of total.	Amount.	Per cent of total.	Amount.	Per cent of total.
Capital stock and bond investment	$2,509,680	100.00	$1,619,680	100.00	$890,000	100.00	$1,110,000	100.00
Individual and share capital stock investment	2,054,500	81.86	1,414,500	87.33	640,000	71.91	1,050,000	94.59
Bond investment	455,180	18.14	205,180	12.67	250,000	28.09	60,000	5.41
Total income	640,992	100.00	450,715	100.00	190,277	100.00	433,518	100.00
Arc	511,937	79.87	369,084	81.89	142,853	75.08	411,443	94.91
Incandescent	93,032	14.51	69,429	15.40	23,603	12.40	18,994	4.38
Motor	23,548	3.67	9,009	2.00	14,539	7.64	1,888	0.44
Miscellaneous	12,475	1.95	3,193	0.71	9,282	4.88	1,193	0.27
Total operating expenses exclusive of depreciation of plant	344,994	100.00	251,161	100.00	93,833	100.00	219,508	100.00
Arc	305,781	88.63	227,034	90.39	78,747	83.92	194,765	88.73
Incandescent	30,999	8.99	19,977	7.96	11,022	11.75	22,449	10.23
Motor	8,214	2.38	4,150	1.65	4,064	4.33	2,294	1.04
Analysis of expenses—total	344,994	100.00	251,161	100.00	93,833	100.00	219,508	100.00
Office and general expenses	58,013	16.81	47,551	18.93	10,462	11.15	43,620	19.87
Motive power	95,730	27.75	88,906	35.40	6,824	7.27	70,123	31.95
Dynamo expense	34,090	9.88	22,584	8.99	11,506	12.26	18,987	8.65
Wages on distribution	46,638	13.52	23,533	9.37	23,105	24.62	25,713	11.71
Trimmers	40,541	11.75	23,884	9.51	16,657	17.75	20,708	9.43
Carbons	27,762	8.05	17,736	7.06	10,026	10.69	14,928	6.80
Globes	2,313	0.67	1,663	0.66	650	0.69	1,579	0.72
Incandescent renewals	3,966	1.15	1,913	0.76	2,053	2.19	2,504	1.14
Incidental expenses on distribution	35,941	10.42	23,391	9.32	12,550	13.38	21,346	9.73
Analysis of income:								
Arc lighting:								
Gross operating income per arc lamp hour (cents)	3.39	.....	3.75	.....	2.71	.....	5.18	.....
Net operating income per arc lamp hour (cents)	1.36	.....	1.44	.....	1.22	.....	2.73	.....
Incandescent lighting:								
Gross operating income per arc lamp hour (cents)	4.86	.....	7.00	.....	2.56	.....	1.89	.....
Net operating income per arc lamp hour (cents)	3.24	.....	4.98	.....	1.37	.....	.....	.....
Gross operating income per incandescent lamp hour (cents)	0.61	.....	0.87	.....	0.32	.....	0.35	.....
Net operating income per incandescent lamp hour (cents)	0.39	.....	.....	.....	.....	.....	.....	.....
Motor:								
Gross operating income per arc lamp hour (cents)	3.65	.....	3.95	.....	3.49	.....	1.63	.....
Net operating income per arc lamp hour (cents)	2.38	.....	2.13	.....	2.51	.....	.....	.....
Analysis of output—total in arc lamp hours	17,670,135	.....	11,057,185	.....	6,612,950	.....	9,070,920	.....
Arc lamp service in arc lamp hours	15,112,195	.....	9,836,635	.....	5,275,560	.....	7,940,040	.....
Incandescent lamp service computed in equivalents to arc lamp hours.	1,912,940	.....	992,550	.....	920,390	.....	1,006,123	.....
Motor service computed in equivalents to arc lamp hours	645,000	.....	228,000	.....	417,000	.....	115,757	.....

a Eight 16-candle power incandescent lamps rated as the equivalent of 1 arc lamp; 1 horse power in motor service rated as the equivalent of 2 arc lamps.
b Five and four-tenths 16-candle power incandescent lamps rated as equivalent of 1 arc lamp; 1 horse power in motor service rated as the equivalent of 3 arc lamps.

STREET LIGHTING BY ELECTRIC ARC LAMPS.

The following tables, 28, 29, and 30, relate to street lighting by arc lamps in each of the cities and towns in the state of New York where such lamps were used in whole or in part for street lighting during the year ended June 30, 1890, excepting the plant in the city of Dunkirk, owned and operated by the municipal government, which is not included in this report.

The various places are grouped according to the motive power used. Table 28 contains a list of places using steam for motive power, and shows for each place the number of single and the number of double lamps, the currents used, the voltage and ampereage, the cost of coal per ton, the contract rates, and the computed lamp rates. Tables 29 and 30 exhibit the same data as above for those plants using water power and for those using both steam and water power.

For purposes of ready comparison Table 31 is arranged to show the number of lamps, hours of service, and contract rates for the 10 largest cities in the state.

Table 32 is a summary for the entire state of the number of lamps, classified by motive power, and shows the number using 400 watts and over and those using less than 400 watts.

Table 33 presents a comparison of the average rates per lamp hour and per kilowatt hour, classified by motive power, and for 400 watts and over and for less than 400 watt lamps.

The rate per lamp hour is calculated by dividing the rate per year by the number of hours per year burned.

The rate per kilowatt hour is calculated by dividing the rate per year by the product of the kilowatt per lamp, multiplied by the hours per year.

TABLE **28.**—MOTIVE POWER: STEAM—STREET LIGHTING BY ARC LAMPS.

CITIES OR TOWNS.	LAMPS AND CURRENTS SUPPLIED.						Cost of coal per ton.	CONTRACTS.				COMPUTED LAMP RATES.			
	Single.			Double.								400 watts and over.		Under 400 watts.	
	Number of lamps.	Volts.	Amperes.	Number of lamps.	Volts.	Amperes.		Term in years.	Nights per year.	Hours per year.	Rate per year per lamp.	Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)	Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)
Total number of lamps.	1,360	.....	.....	6,957	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Albany (*a*)	.....	.....	.....	519	50	10.0	$3.40	5	365	3,950	$182.50	4.6	9.2	.....	.....
Alexandria Bay	8	50	9.7	.....	.....	.....	1.30	1	365	2,008	77.56	3.9	8.0	.....	.....
Amsterdam	.....	.....	.....	118	50	6.8	(*b*)	3	365	3,950	160.00	.....	.....	2.5	7.4
Auburn	77	50	9.6	.....	.....	.....	2.58	1	365	2,370	75.00	3.2	6.6	.....	.....
Do	.....	.....	.....	50	50	9.6	2.58	3	365	3,950	87.00	2.2	4.6	.....	.....
Babylon	5	50	6.8	10	50	6.8	4.50	1	365	3,102	109.50	.....	.....	3.5	10.4
Batavia	.....	.....	.....	70	50	9.6	2.00	1	365	1,884	62.50	3.3	6.9	.....	.....
Binghamton	32	45	10.0	91	45	10.0	1.75	1	365	3,950	131.40	3.3	7.4	.....	.....
Boonville	7	50	9.6	12	50	9.6	(*b*)	1	250	1,375	53.66	3.9	8.1	.....	.....
Brockport	39	45	6.8	.....	.....	.....	2.70	5	264	1,452	72.00	.....	.....	5.0	16.2
Brooklyn	309	46	6.8	1,213	46	6.8	3.50	1	365	3,950	182.50	.....	.....	4.6	14.8
Buffalo	.....	.....	.....	210	30	20.0	1.70	1	365	3,924	146.00	3.7	6.2	.....	.....
Do	.....	.....	.....	754	45	9.6	2.00	1	365	3,924	146.00	3.7	8.6	.....	.....
Do	.....	.....	.....	404	45	10.0	2.10	1	365	3,924	146.00	3.7	8.3	.....	.....
Canandaigua	70	45	10.0	.....	.....	.....	(*b*)	3¾	230	1,265	69.00	5.5	12.1	.....	.....
Canastota	41	45	10.0	1	45	10.0	3.20	1	365	1,714	72.00	4.2	9.3	.....	.....
Catskill	.....	.....	.....	49	50	6.8	3.25	1	264	1,716	62.50	.....	.....	3.6	10.7
Clayton	.....	.....	.....	13	50	9.6	2.00	3	276	1,518	69.23	4.6	9.5	.....	.....
Cooperstown	3	45	8.0	.....	.....	.....	4.40	50	312	1,716	50.00	2.9	8.1	.....	.....
Cortland	59	20	30.0	.....	.....	.....	(*b*)	10	264	1,452	79.20	5.5	9.1	.....	.....
Dansville	26	50	7.5	.....	.....	.....	2.50	3	264	1,452	72.00	.....	.....	5.0	13.2
Dobbs Ferry	.....	.....	.....	22	50	9.6	3.50	1	365	3,200	100.00	3.1	6.5	.....	.....
Elmira	23	52	8.0	.....	.....	.....	2.27	3	365	3,950	105.85	2.7	6.4	.....	.....
Do	.....	.....	.....	36	45	6.8	2.27	3	365	3,950	105.85	.....	.....	2.7	8.8
Fort Plain	49	45	6.8	.....	.....	.....	2.85	3	276	1,518	53.75	.....	.....	3.5	11.6
Frankfort	15	20	23.0	.....	.....	.....	(*b*)	1	312	1,733	92.00	5.3	11.5	.....	.....
Geneva	64	45	9.6	.....	.....	.....	2.50	5	250	1,375	78.20	5.7	13.2	.....	.....
Glens Falls	72	50	10.0	.....	.....	.....	3.43	3	276	2,704	71.76	2.7	5.3	.....	.....
Gloversville	.....	.....	.....	69	50	6.8	4.00	2	365	2,372	60.00	.....	.....	2.5	7.4
Gouverneur	.....	.....	.....	31	50	9.6	(*c*)	3	276	1,518	50.00	3.3	6.9	.....	.....
Hornellsville	.....	.....	.....	65	45	9.6	1.90	3	365	3,950	100.00	2.5	5.9	.....	.....
Hudson	.....	.....	.....	82	50	6.8	3.65	1	365	3,950	116.76	.....	.....	3.0	8.7
Ithaca	76	45	9.5	.....	.....	.....	2.10	5	250	1,750	51.00	2.9	6.8	.....	.....
Lockport	.....	.....	.....	38	50	9.6	1.90	1	365	3,083	80.00	2.6	5.4	.....	.....
Lowville	8	50	9.6	19	50	9.6	3.75	1	276	1,518	60.00	4.0	8.2	.....	.....
Middletown	.....	.....	.....	14	45	6.8	2.75	1	365	3,950	125.00	.....	.....	3.2	10.3

a In Albany the maintenance of hoods, poles, and lamps is paid for by the municipal authorities. *b* Power rented. *c* Wood used for fuel.

TABLE 28.—MOTIVE POWER: STEAM—STREET LIGHTING BY ARC LAMPS—Continued.

CITIES OR TOWNS.	LAMPS AND CURRENTS SUPPLIED.						Cost of coal per ton.	CONTRACTS.				COMPUTED LAMP RATES.			
	Single.			Double.				Term in years.	Nights per year.	Hours per year.	Rate per year per lamp.	400 watts and over.		Under 400 watts.	
	Number of lamps.	Volts.	Amperes.	Number of lamps.	Volts.	Amperes.						Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)	Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)
Mount Vernon				30	50	9.6	(a)	1	365	3,950	$100.00	2.5	5.3		
Newark	40	45	10.0				$2.45	5	312	2,028	60.00	3.0	6.6		
New Brighton				100	50	6.5	3.00	1	365	4,000	80.00			2.0	6.2
Newburg				113	46	6.8	2.14	1	365	3,950	114.00			2.9	9.2
New Rochelle				28	50	6.8	5.25	1	365	3,950	127.75			3.2	9.5
New York				384	35	20.0	3.00	1	365	3,950	127.75	3.2	4.6		
Do				488	45	10.0	3.00	1	365	3,950	127.75	3.2	7.2		
Norwich				35	45	9.6	3.10	1	288	3,096	100.00	3.2	7.5		
Nyack	14	50	9.6				2.25	1	240	2,280	83.40	3.7	7.6		
Do				38	50	9.6	2.25	1	365	3,950	125.55	3.2	6.6		
Do				23	50	9.6	2.25	1	240	1,800	81.92	4.6	9.5		
Ogdensburg	6	45	9.0	84	45	9.0	4.00	5	240	1,440	72.00	5.0	12.3		
Olean				22	45	9.5	(b)	1	365	3,950	120.00	3.0	7.1		
Oneida	10	45	10.0	57	45	10.0	3.00	1	300	1,050	75.00	4.5	10.1		
Oneonta				32	50	9.6	3.25	1	365	3,950	127.72	3.2	6.7		
Potsdam	45	50	6.8				(a)	1	264	1,716	60.00			3.5	10.3
Port Chester				50	50	6.8	3.75	1	365	3,950	100.00			2.5	7.4
Port Jervis	8	50	7.0	8	50	7.0	1.60	2	365	3,950	90.00			2.3	6.5
Do	45	50	7.0	38	50	7.0	1.60	2	365	3,950	105.00			2.7	7.6
Poughkeepsie				215	45	10.0	3.58	1	365	4,014	113.00	2.8	6.3		
Richfield Springs				25	45	9.6	3.50	1	365	2,385	90.00	3.8	8.7		
Rochester				43	45	10.0	2.15	5	365	3,950	98.55	2.5	5.5		
Rome				104	50	10.0	3.00	5	324	3,240	106.92	3.3	6.6		
Do				43	30	23.0	3.00	5	324	3,240	106.92	3.3	4.8		
Sandy Hill	38	50	10.0				3.25	1	276	1,788	84.00	4.7	9.4		
Schenectady				113	20	23.0	3.35	3	365	3,950	135.05	3.4	7.4		
Syracuse				309	48	10.0	2.00	5	365	3,950	144.00	3.6	7.6		
Tarrytown	67	45	6.7				4.19	1	365	2,112	75.00			3.6	11.8
Troy				280	45	10.0	3.00	5	365	3,885	144.00	3.7	8.2		
Unadilla	18	45	10.0				(a)	1	365	2,008	70.00	3.5	7.7		
Utica				368	25	20.0	2.56	3	365	3,650	127.75	3.5	7.0		
Waterloo	51	50	10.0				2.10	5	264	1,452	60.00	4.1	8.3		
White Plains	8	50	6.8				5.25	5	365	2,000	70.00			3.5	10.3
Do				12	50	6.8	5.25	5	365	4,000	140.00			3.5	10.3
Yonkers	27	45	7.0	25	45	7.0	3.08	5	365	3,950	100.00			2.5	8.0
Average rates												3.6	7.7	3.2	9.8

a Power rented.

Natural gas used for fuel.

TABLE 29.—MOTIVE POWER: WATER—STREET LIGHTING BY ARC LAMPS.

CITIES OR TOWNS.	LAMPS AND CURRENTS SUPPLIED.						CONTRACTS.				COMPUTED LAMP RATES.			
	Single.			Double.							400 watts and over.		Under 400 watts.	
	Number of lamps.	Volts.	Ampères.	Number of lamps.	Volts.	Ampères.	Term in years.	Nights per year.	Hours per year.	Rate per year per lamp.	Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)	Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)
Total number of lamps	284			1,592										
Adams	15	50	9.5				1	264	1,320	$60.00	4.5	9.6		
Carthage				30	48	9.6	5	324	1,782	60.00	3.4	7.3		
Cohoes				100	45	6.8	5	365	3,950	120.00			3.0	9.9
Fulton	74	48	10.0				3	365	2,007	54.00	2.7	5.6		
Greenwich	41	45	10.0				1	240	1,320	50.00			3.8	8.4
Hoosick Falls	33	45	6.8	30	45	6.8	5	276	1,518	60.00			4.0	12.9
Johnstown	50	45	10.0				2	365	2,555	75.00	2.9	6.5		
Jordan (a)	16	50	6.8				1	312	2,744	50.00			1.8	5.4
Mexico	21	50	9.6				5	276	1,518	50.00	3.3	6.9		
New Berlin	1	45	8.0				1	365	3,950	75.00	1.9	5.3		
Niagara Falls				37	45	9.6	1	329	3,300	90.00	2.7	6.3		
Oswego				171	45	9.5	5	365	3,950	100.00	2.5	5.9		
Penn Yan				45	50	9.0	3	365	3,950	73.33	1.9	4.1		
Rochester				274	30	20.0	5	365	3,950	104.02	2.6	4.4		
Do				805	45	9.6	5	365	3,950	102.20	2.6	6.0		
Suspension Bridge				10	45	9.6	1	329	3,300	90.00	2.7	6.3		
Ticonderoga	10	50	6.8				1	365	2,008	75.00			3.7	11.0
Watertown	23	50	10.0	90	50	10.0	7	240	1,320	68.00	5.2	10.3		
Average rates											3.0	6.5	3.1	9.2

a Burn out a full carbon.

TABLE 30.—MOTIVE POWER: STEAM AND WATER—STREET LIGHTING BY ARC LAMPS.

CITIES OR TOWNS.	LAMPS AND CURRENTS SUPPLIED.						Cost of coal per ton.	CONTRACTS.				COMPUTED LAMP RATES.			
	Single.			Double.								400 watts and over.		Under 400 watts.	
	Number of lamps.	Volts.	Amperes.	Number of lamps.	Volts.	Ampères.		Term in years.	Nights per year.	Hours per year.	Rate per year per lamp.	Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)	Per lamp hour. (Cents.)	Per kilowatt hour. (Cents.)
Total number of lamps	200			25											
Canton	6	45	6.8	20	45	6.8	(a)	5	276	1,518	$60.00			4.0	12.9
Lyons	54	50	6.8				$2.50	5	312	2,028	60.00			3.0	8.7
Malone	37	47	6.8	5	47	6.8	5.00	1	276	1,518	66.00			4.4	13.7
Mount Morris	32	50	6.0				2.40	5	365	2,007	49.00			2.4	8.1
Phœnix	24	50	6.8				3.00	1	365	2,007	45.50			2.3	6.7
Plattsburg	47	45	6.8				4.00	5	365	2,920	75.00			2.6	8.4
Average rates														3.1	9.8

a Wood used for fuel.

TABLE 31.—LAMPS—NUMBER OF HOURS OPERATED AND RATES IN 10 PRINCIPAL CITIES.

CITIES.	NUMBER OF LAMPS.		Number of hours operated per year.	RATES.				
				Per lamp per year.	400 watts and over.		Under 400 watts.	
	Single.	Double.			Per lamp hour. (Cents.)	Per kilowatt hour. (Cents).	Per lamp hour. (Cents).	Per kilowatt hour. (Cents).
Total number of lamps	368	6,167						
New York		872	3,950	$127.75	3.2	5.9		
Brooklyn	309	1,213	3,950	182.50			4.6	14.7
Buffalo		1,368	3,924	146.00	3.7	7.7		
Rochester		1,122	3,950	102.00	2.6	5.3		
Albany		519	3,950	182.50	4.6	9.2		
Syracuse		309	3,950	144.00	3.6	7.6		
Troy		280	3,885	144.00	3.7	8.2		
Utica		368	3,650	127.75	3.5	7.0		
Binghamton	32	91	3,950	131.40	3.3	7.4		
Yonkers	27	25	3,950	100.00			2.5	8.0
Average rates					3.5	7.3	3.5	11.3

TABLE 32.—CLASSIFICATION OF ELECTRIC ARC LAMPS ACCORDING TO MOTIVE POWER.

LAMPS.	MOTIVE POWER.			
	Total.	Steam.	Water.	Steam and water.
Total number of lamps	a10,418	8,317	1,876	225
Lamps 400 watts and over	1,844	1,360	284	200
Lamps under 400 watts	8,574	6,957	1,592	25

a The difference between this total and that appearing in Table 17 is made up of lamps installed after May 31, 1890, the fiscal year of several stations not closing until after that date.

TABLE 33.—COMPARISON OF AVERAGE RATES OF COST CLASSIFIED BY MOTIVE POWER.

ITEMS.	AVERAGE RATES. (CENTS.)		
	Steam.	Water.	Steam and water.
Per lamp hour, 400 watts and over	3.6	3.0	
Per lamp hour, under 400 watts	3.2	3.1	3.1
Per kilowatt hour, 400 watts and over	7.7	6.5	
Per kilowatt hour, under 400 watts	9.8	9.2	9.8

STREET LIGHTING BY ELECTRIC INCANDESCENT LAMPS.

Table 34 contains a list of cities or towns using incandescent lamps in whole or in part for street lighting. It is arranged to show the number of lamps of each candle power in use, the motive power and cost of fuel, the term of contract in years, rate per year, nights per year, hours per year, and estimated total contract receipts, unit rates per 1,000 candle hours, and per 25 candle power lamp per month. The average unit rates are also stated.

The term in years is the total length of time for which a contract is given.

The receipts are calculated for the given number of lamps at the stated contract rate.

The unit rate per 1,000 candle hours is obtained by reducing the given lamps to the total candle power. The result is multiplied by the number of hours per year, the product divided by 1,000, and the quotient used as a divisor into the total receipts.

The unit rate per 25 candle power lamp per month is obtained by reducing the given lamps to 25 candle power unit and dividing the number of such units into the total receipts, the quotient being divided by the number of months used per year.

TABLE **34.**—STREET LIGHTING BY INCANDESCENT LAMPS.

CITIES OR TOWNS.	NUMBER OF LAMPS OF EACH CANDLE POWER.									Motive power.	Cost of coal per ton, delivered at works.	CONTRACT.					RATE PER UNIT.	
	Total lamps.	Candle power grouped by number of candles and number of lamps in each group.										Term in years.	Rate per lamp per year.	Number of nights per year.	Number of hours per year.	Total receipts per year.	Per 1,000 candle hours.	Per lamp per month, 25 candle power unit.
		16	20	25	30	32	40	45	65									
Total number of lamps.	a3,736	313	1,209	2,002	10	151	4	35	12							$62,122		
Baldwinsville	95	95								Water		2	$15.00	365	3,950	1,425	$0.237	$1.95
Ballston (b)	180			180						Steam	$3.52	5	{16.50 / 22.00	312 / 365	1,980 / 3,950	3,190	0.293	1.47
Binghamton (c)	50			50						Steam	1.75	1	5.00	120	600	250	0.333	1.25
Boonville	4						4			Steam	(d)	1	(e)	250	1,375	80	0.364	1.50
Brockport	12								12	Steam	2.70	5	24.00	264	1,450	288	0.255	1.05
Camden	48			48						Steam	3.30	5	12.50	365	2,008	600	0.249	1.04
Chatham	80			80						Steam	4.00	5	16.14	276	2,070	1,291	0.312	1.75
Cooperstown	61		61							Steam	4.40	50	14.16	312	1,716	864	0.413	1.70
Dansville (f)	25	13				12				Steam	2.50	3	{10.00 / 15.00	365	3,950	310	0.133	1.09
Dolgeville	169	169								Water	(d)	1	12.00	365	3,950	2,028	0.190	1.56
East Albany	176			176						Steam	2.75	2	18.20	365	3,950	3,203	0.184	1.52
Fairport	36	36								Steam	(d)	1	14.50	324	3,396	522	0.267	2.10
Fort Edwards	120			120						Steam	3.33	1	20.00	365	3,950	2,400	0.203	1.67
Hempstead	79		79							Steam	5.62	5	25.00	365	3,950	1,975	0.316	2.60
Holly	62			62						Steam	2.65	3	12.00	264	1,452	744	0.331	1.36
Lockport (g)	203		203							Steam	1.90	1	14.00	365	3,083	2,842	0.227	1.46
Matteawan	235		200					35		Composite	3.07	1	20.00	336	3,590	4,700	0.235	1.88
Mount Morris	6					6				Composite	2.40	5	10.00	365	1,916	60	0.163	0.65
New Berlin	43			43						Water		1	15.00	365	3,950	645	0.152	1.25
New Rochelle	114					114				Steam	5.25	1	25.55	365	3,950	2,913	0.202	1.66
Rochester	676		666		10					Steam	2.15	5	18.25	365	3,950	12,337	0.229	1.89
Sing Sing	43			43						Steam	3.90	1	25.00	365	3,950	1,075	0.253	2.08
St. George	1,200			1,200						Steam	3.00	1	15.00	365	4,000	18,000	0.150	1.25
Waverly	19					19				Steam	2.00	5	20.00	264	1,450	380	0.431	1.78
Average unit rates.																	0.254	1.46

a The difference between this total and that appearing in Table 17 is made up of lamps installed after May 31, 1890, the fiscal year of several stations not closing until after that date.

b 140 lamps, run 312 nights per year, at $16.50 per lamp; 40, run 365 nights, at $22.00 per lamp.

c These lamps are in a park and run but 4 months in the year.

d Power rented.

e Special.

f The rate for 16 candle power lamps is $10 per year; 32 candle power, $15 per year.

g Part of these lamps are run to 1 a. m. and others to 3 a. m.

ACCUMULATORS OR STORAGE BATTERIES USED WITH LIGHTING PLANTS.

Two central electric light and power stations have auxiliary plants of storage batteries, viz:

Cooperstown has 56 cells used in series on a continuous current incandescent circuit in the early morning and during the day, when the load is light. The maximum load is stated as 35 amperes, and a 110 volt current is used for charging.

Waterloo uses 126 cells in series on a 3 wire continuous current incandescent system; the maximum load is 30 amperes, and the total capacity of the battery is 300 ampere hours. The voltage of charging current is 132.

Under the head of isolated electric lighting plants, in Table 5, ante, it is stated that the number of accumulator cells in use in the city of New York is 531; in the state of New York, outside of the city, 422; and for the state of New York as a whole, 953. The number of incandescent lamps connected directly to accumulators is shown to be, for the city of New York, 911; for the state of New York, outside of the city, 445; and for the state of New York as a whole, 1,356.

ELECTRIC STREET RAILWAYS.

The first electric street railway in the state of New York commenced operation during the year ended June 30, 1886, since which date to June 30, 1890, there were 10 roads electrically equipped, making 11 in all, installed as follows: 1 road in 1886, 2 roads in 1887, 1 road in 1888, 4 roads in 1889, 3 roads in 1890. Of the total number, 9 originally used horses for motive power and 2 are original electric roads.

The advantages of the adoption of electric motive power may be inferred from the fact that 9 companies, in reply to a special inquiry, report an increase of 69 per cent in the number of passengers carried in the year immediately following the adoption of such motive power in lieu of horses.

The data herein presented deal only with the power plant equipment, electrical equipment, and such details of track construction as are of interest in connection with questions of electrical traction.

The following table shows the number of power stations, the number and total indicated horse-power capacity of steam engines, the number of electrical generators of each specified capacity, the total number of generators, and the total kilowatt capacity of all generators:

TABLE 35.—STATION EQUIPMENT, ELECTRIC STREET RAILWAYS.

NUMBER OF POWER STATIONS.	STEAM ENGINES.		ELECTRICAL GENERATORS.							
			Number at 500 volts.					Number at 180 volts.	Total number.	Total capacity, kilowatts.
	Number.	Indicated horse power.	125 amperes.	140 amperes.	160 amperes.	200 amperes.	500 amperes.	207 amperes.		
9(a)	22	4,170	15	14	7	4	2	1	43	3,415

a 1 company has 2 stations; 3 companies rent power from electric lighting stations.

The following table relates to motor equipment. The motors in use are continuous current, constant voltage, variable ampereage, series wound, wired in multiple. This table shows the number of motors of each specified capacity, the total number of motors, and the total kilowatt capacity of all motors:

TABLE 36.—MOTOR EQUIPMENT, ELECTRIC STREET RAILWAYS.

MOTORS—CONTINUOUS CURRENT, CONSTANT VOLTAGE, VARIABLE AMPEREAGE, SERIES WOUND, CONNECTED IN MULTIPLE.

TOTAL NUMBER OF MOTORS.	500 VOLTS.					180 VOLTS.		Total kilowatt capacity of all motors.
	20 amperes.	25 amperes.	35 amperes.	40 amperes.	50 amperes.	70 amperes.	94 amperes.	
458	26	381	4	40	4	2	1	5,800

The following table relates to car equipment. This table shows the number of cars carrying one motor, the number of cars carrying two motors, the number of cars carrying the specified horse power in motors, the total number of motor cars, the total horse power of all motors, the number of trail cars, and the average number of cars operated at one time:

TABLE 37.—CAR EQUIPMENT, ELECTRIC STREET RAILWAYS.

TOTAL NUMBER OF MOTOR CARS.	Number of cars carrying one motor.	Number of cars carrying two motors.	HORSE POWER OF MOTORS PER CAR, AND NUMBER OF CARS OF EACH CLASS.					Total horse power of all motors.	Number of trail cars.	Average number of cars operated simultaneously.
			12 horse power.	15 horse power.	20 horse power.	30 horse power.	50 horse power.			
			Number of cars.	Number of cars.	Number of cars.	Number of cars.	Number of cars.			
246	44	202	4	37	26	159	20	6,893	71	182

The following table relates to miscellaneous equipment and car lighting. This table shows the number of electric snow plows and number of plows having the specified horse power in motors per plow, the number of cars lighted by electricity, total number of lamps wired in series in groups of the specified number, total number of lamps used for car lighting, and the number of lamps of the voltages specified. The total number of electrical devices in station is also stated.

TABLE **38.**—MISCELLANEOUS EQUIPMENT AND CAR LIGHTING, ELECTRIC STREET RAILWAYS.

NUMBER OF ELECTRIC SNOW PLOWS.	HORSE POWER OF MOTORS PER SNOW PLOW.			CAR LIGHTING.								Number of electrical devices in stations.
				Number of cars lighted by electricity	Number and arrangement of lamps.				Voltage of lamps used.			
	15 horse power plows, number.	20 horse power plows, number.	30 horse power plows, number.		3 in series—lamps, number.	5 in series—lamps, number.	10 in series—lamps, number.	Total lamps used for car lighting.	50 volts—lamps, number.	100 volts—lamps, number.	110 volts—lamps, number.	
7	2	1	4	246	9	1,160	110	1,279	119	900	260	316

The following table relates to details of line construction. This table shows the number of companies using single or double overhead trolley, the number of companies using each specified style of trolley wire suspension, and the miles of road equipped for each, the number of companies using the specified number of poles per mile, the size of trolley wires in use, the number of companies using each size and the number of miles of each size, the size of feeder wires in use, the number of companies using each size and the number of each size, the number of feeder wires leaving power stations and the number of companies using each number specified, the voltage carried at stations and the voltage carried at furthermost terminal, and the number of companies using the respective quantities:

TABLE **39.**—LINE CONSTRUCTION, ELECTRIC STREET RAILWAYS—OVERHEAD TROLLEY.

DESCRIPTION.	Number of companies.	DESCRIPTION.	Number of companies.	Number of miles of wire.
Style of service:		Style of suspension trolley wire		89.23
Single	10			
Double	1	Cross	5	63.83
Number of poles per mile, counting one side only:		Center pole	1	6.00
35	1	Bracket	4	19.40
42	2	Cross and bracket		
43	1	Center pole and bracket	1	
44	4			
46	1	Trolley wire, Brown & Sharpe gauge number		134.70
52	1			
55	1	00	5	55.50
Number of feeder wires leaving power station:		0	3	30.00
1	1	1	1	18.00
2	5	2	1	21.40
4	2	3	1	9.80
6	2			
9	1	Feeder wire, Brown & Sharpe gauge number (*a*)		64.00
Voltage carried at station:				
550	1	0000	3	14.00
500	8	000	2	10.50
425	1	00	5	34.50
180	1	0	2	5.00
Voltage carried at furthermost terminal:		None	2	
475	2			
470	1			
450	3			
425	2			
400	1			
375	1			
160	1			

a One company uses 3 sizes of wire for feeders, and one uses 2 sizes.

The following table exhibits details of track engineering and construction. The total mileage of streets over which electric cars are operated is 89.23. The gauge of track is uniformly 4 feet 8½ inches, or "standard gauge".

TABLE 40.—ENGINEERING AND CONSTRUCTION, ELECTRIC STREET RAILWAYS.

	FEET RADIUS.
Radius of minimum curve of track:	
1 company reports	30
1 company reports	35
1 company reports	36
1 company reports	40
1 company reports	45
1 company reports	50
1 company reports	60
1 company reports	75
1 company reports	100
1 company reports	175
1 company reports	269
Maximum grade, rise per 100 feet of track:	FEET.
2 companies report	2
1 company reports	3
1 company reports	4
2 companies report	5
1 company reports	6
3 companies report	8
1 company reports	15

MILEAGE OF SPECIFIED WEIGHTS OF RAIL.

DESCRIPTION.	POUNDS PER YARD AND MILEAGE OF EACH WEIGHT.											
	Total.	25	35	40	45	47	50	55	60	62	63½	66½
Mileage of each weight	133.70	0.75	21.30	13.40	20.50	0.75	7.00	12.50	12.50	9.50	18.00	17.50
Girder rails	52.00	.....	.....	.....	.....	.....	7.00	.....	.....	9.50	18.00	17.50
T rails	53.15	0.75	6.00	13.40	8.00	.....	.....	12.50	12.50	.....	.....	.....
Tram rails	28.55	.....	15.30	.....	12.50	0.75	.....	.....	.....	.....	.....	.....

ELECTRIC WELDING.

One company commenced the use of electric welding October 1, 1890. It installed one electric welder of 20,000 watts capacity. This welder is used for welding fifth wheels for heavy wagons. The method superseded by electric welding was forge welding. The owners of the establishment certify that an electric weld for this work can be made in 10 minutes, whereas the time required for making a similar weld by forge welding was 45 minutes; that the saving in expense is about 38 cents per weld, after paying 10 cents per weld royalty, over the expense of forge welding. The cost and present value (1890) of the welder is stated to be $2,000.

ELECTRIC SMELTING.

The first electric smelting company commenced business in 1887. The cost of the works, including $21,000 for land and power site, was $90,000; the cost of additions since made was $50,000, making the total cost of the works $140,000; from this cost $15,000 is deducted, making the present value of the works as given (1890) $125,000.

The power plant consists of 1 steam engine, 1,000 horse power capacity, and 4 horizontal water wheels of 500, 480, 50, and 200 horse power respectively, using head water averaging 34 feet.

The electric plant for smelting consists of four dynamos, continuous current, constant voltage, variable ampereage, of the following capacities: three dynamos of 70 volts, 3,000 amperes, 210,000 watts each, and one dynamo of 50 volts, 1,200 amperes, 60,000 watts; also one dynamo of 500 volts, 6.8 amperes, 3,400 watts, used for lighting purposes.

The total capacity of the dynamos used for smelting purposes is 690,000 watts.

The raw material used is aluminum, silica, manganese, copper, and iron ores, partly imported from Germany and partly from southern states of the United States. The quantity of raw material handled is about 2,000 pounds per day. Electricity is used for heat only. The anode and the cathode are composed of carbon and metal and other materials. The crucibles are connected in series, varying in number from 6 to 8. The whole number of crucibles used varies from 2 to 20. The products are aluminum and alloys, and the alloys of silicon and of manganese. The quantity of refined metal produced per day is 1,500 pounds.

USES OF ELECTRICITY IN MEDICINE AND SURGERY.

The uses of electricity in medicine and surgery are being rapidly developed as an important part of medical science. Without attempting to give exact technical details, which can properly be based only on professional reports, carefully verified and compiled by an expert specialist in this department of science, the following data are given for the state of New York, as indicative of the condition of the art and its practice in 1890:

6 manufacturers report manufactures of electrical specialties for the uses of medicine and surgery.

5 medical colleges report giving a course of instructions in electro-therapeutics and electro-surgery.

51 hospitals report making 17,071 applications of electricity in medical and surgical practice.

65 physicians report having electrically treated 16,072 patients during the census year of 1890.

DISTRICT MESSENGER ELECTRICAL CALL SERVICE.

The first American district telegraph company was organized in 1872. It commenced business with 1 office and 4 subscribers. In 1874 there were 10 offices and 200 subscribers in the state of New York. In 1878 there were 21 offices, 4,500 subscribers, and 600 messengers. In 1885 there were 52 offices, 11,897 call boxes (subscribers), and 903 messengers.

The first messenger call boxes used by the company had spring clockwork which required winding up with a key. They were covered by a glass globe. In 1874 automatic call boxes were substituted for the winding clockwork instruments.

The following table shows details relating to the number of companies reported for the state of New York, number of shareholders, total capitalization, capital employed, wages, and all other expenses (excepting depreciation of plant), and total income:

TABLE 41.—GENERAL STATEMENT.

Number of companies reported	9
Number of shareholders	369
Total capitalization	$3,187,682
Share investment	3,150,804
Surplus	36,878
Capital employed—aggregate	1,540,785
Plant, total	1,081,460
Live assets—total	459,325
Value of franchise	243,600
Value of securities	215,725
Wages	434,597
Average number of employés	1,599
Managers and office force	167
Messenger force	1,379
Construction and repair force	33
Police detail	20
Miscellaneous expenses	$150,288
Rent of central offices	9,643
Rent of other offices	25,739
Privileges of poles	936
Telephones	180
Office furniture and repairs	2,973
Stationery	9,055
Fuel and light	4,618
Instruments, renewals, and repairs	1,487
Batteries, renewals, and repairs	2,440
Lines, renewals, and repairs	28,667
Insurance	39
Sundries, not elsewhere reported	64,511
Total income	659,861

The following table shows details regarding operating instruments, batteries, miles of wire, line construction, and service capacity; also, services performed:

TABLE 42.—FACILITIES FURNISHED AND SERVICES PERFORMED.

Operating instruments:	
Galvanometers	1
Automatic signal receiving	252
Telephones	10
Batteries:	
Leclanché, number	568
Bluestone, number	2,945
Miles of wire—total	1,114
Insulated copper	421
Galvanized iron	213
Insulated iron	459
Conductor in cable (carried in 2 miles of cable)	21
Line construction:	
Miles of circuits	1,114
Total number of circuits	428
Grounded	16
Metallic	412
Service capacity:	
Number of circuits	428
Number of offices	76
Number of call boxes	25,009
Services performed:	
Number of calls	2,624,748
Number of messages collected	1,766,745
Number of messages delivered	5,449,235
Average number of calls per box	104.95
Average number of calls per messenger	1,903.37

MUNICIPAL POLICE PATROL TELEGRAPH SERVICE.

There are 5 cities in the state of New York reporting the use of police telegraph service.

The following table shows the value of the plants, wages, average number of employés, and the amount of miscellaneous expenses for the year, excluding allowance for depreciation of plant:

TABLE 43.—INVESTMENT AND EXPENSES.

Number of municipalities reporting	5
Value of plant—total	$127,273
Office fixtures and furniture	831
Electric plant in station	34,850
Underground conductors	9,323
Aerial service conductors	32,469
Terminal apparatus and stations	49,550
Supplies on hand	250
Wages	45,560
Average number of employés	32
Superintendents and inspectors	14
Clerks and operators	17
Helpers and watchmen	1
Miscellaneous expenses	$15,850
Telephone rentals	7,927
Repairs to office fixtures	175
Stationery	25
Repairs and renewals to instruments	1,350
Repairs and renewals to batteries	1,498
Repairs to lines	650
Sundries not elsewhere reported	4,225

The following table is arranged to show the number of operating instruments in use, the number of batteries and generators, the mileage and kinds of wire, number and type of circuits, location and style of patrol boxes, and location of telephone stations:

TABLE 44.—FACILITIES FURNISHED.

Operating instruments—total number	1,178
Transmitting	544
Receiving	222
Telephones	412
Signal announcing and registers—total number	64
Visual indicators with gongs	19
Gongs	35
Ink registers	10
Testing instruments—total number	44
Galvanometers	43
Testing sets	1
Batteries—total number	2,318
Leclanché	351
Bluestone	1,277
Smee	395
Dry	275
Carbon	20
Generators, power	1
Miles of wire—total	600
Galvanized iron, bare	90
Galvanized iron, insulated	300
Bare copper	107
Insulated copper	70
Miles of conductor in cables	33
Number and style of circuits	62
Patrol box circuits	32
Other circuits	30
Miles of circuits	600
Patrol box circuits, metal	196
Patrol box circuits, grounded	35
Other circuits, metal	59
Other circuits, grounded	310
Location of patrol boxes—total number	394
On buildings	29
On poles	175
In booths	185
In patrol wagon stations	5
Patrol boxes, operated by spring	394
Location of telephone stations—total number	81
Patrol wagon stations	11
Police stations	31
Ambulance stations	5
Coroners' offices	6
Police headquarters	23
Municipal offices	2
Residence of members of the force	3

The following table shows the amount and character of the service rendered:

TABLE 45.—USE MADE OF FACILITIES.

Character of service:	
Number of calls—total	1,964,043
Coroner notified	6,136
Relating to fires	69,694
Description of stolen property	23,905
Description of missing persons	47,242
Classified	132,583
Miscellaneous	1,648,558
Character of service—Continued.	
Wagon calls—total number	35,925
Conveyance of prisoners	14,708
Conveyance of injured persons	6,429
Conveyances of officers to fires	445
Miscellaneous calls	14,343

MUNICIPAL FIRE ALARM TELEGRAPH SERVICE.

There are 36 cities in the state of New York reporting the use of fire alarm telegraph service.

The following table shows the value of the plants, wages, average number of employés, and the amount of miscellaneous expenses for the year:

TABLE 46.—INVESTMENT AND EXPENSES.

Number of municipalities reporting	36
Value of plant—total	$813,958
Office furniture	3,465
Electric plant in station	79,694
Aerial conductors	152,805
Underground conductors	243,760
Terminal apparatus and stations	328,026
Supplies on hand	6,208
Wages	108,592
Average number of employés	140
Superintendents, inspectors, and linemen	56
Clerks and operators	31
Helpers, watchmen, and others	53
Miscellaneous expenses—total	$38,811
Rental for telephones	5,244
Repairs to office fixtures	1,781
Stationery	29
Fuel and light	302
Repairs and renewals to instruments	4,737
Repairs and renewals to batteries	9,119
Repairs to lines	8,564
Insurance	124
Sundries not elsewhere reported	8,911

The following table is arranged to show the number of operating instruments in use, the number of batteries, the mileage of and kind of wire, number and type of circuits, location and number of boxes and bells, number and style of alarm boxes, number and style of receiving and recording devices; also, the number of alarms and value of property destroyed during the year:

TABLE 47.—FACILITIES FURNISHED AND USE MADE THEREOF.

Alarm, announcing apparatus:	
Visual indicators combined with gongs	82
Visual indicators	21
Gongs	333
Bellstrikers	44
Jokers	31
Sounders	44
Telephones	221
Testing instruments	239
Galvanometers	235
Testing sets	4
Batteries	7,483
Leclanché	413
Bluestone	1,070
Miles of wire—total	2,866
Galvanized iron	1,823
Galvanized iron, insulated	3
Galvanized steel	7
Bar copper	412
Insulated copper	96
Length of conductor in 106 miles of cable (a)	525
Number of circuits, continuous current	218
Grounded	17
Metallic	201
Location and number of boxes and bells communicating:	
On buildings	524
On poles	2,176
In engine houses	314
In municipal offices	26
In residences of members of the force	43
Public alarm bells	44
Alarm boxes:	
Operated by weight	347
Operated by spring	2,606
Having keyless doors	292
Having trap locks	2,529
All other styles	132
Central office receiving and recording devices:	
Register, inking	28
Register, embossing	5
Repeaters, dial	6
Repeaters, automatic	14
Others	12
Number of alarms during the year—total	61,550
Alarms during the day	2,936
Alarms during the night	3,357
False alarms	153
Test alarms	55,104
Value of property destroyed during the year	$7,825,241

a Nearly all of this cable is underground.

CHEMICALS AND ALLIED PRODUCTS.

CHEMICALS AND ALLIED PRODUCTS.

BY HENRY BOWER AND HENRY PEMBERTON, JR.

The Tenth Census was the starting point for the publication of special reports relating to the manufacture of chemicals, but owing to changes in the form of inquiry and the inclusion of certain allied industries not reported as chemicals at the census of 1880, and the exclusion of others that were included under this head at the Tenth Census, a true comparison is impossible.

Castor oil, glucose, and soap, allied products included in the chemical report of the Tenth Census, were not so enumerated at the Eleventh. Pharmaceutical preparations, ready mixed paints, varnishes, and japans, reported among the general statistics of manufactures in 1880, are included in the totals presented in this report. Baking powder, blacking, cottonseed oil, glue, inks, linseed oil, patent medicines or proprietary goods, vinegar, whiting, and paris white appear in the general statistics of manufactures for both census years.

The totals for the chemical industry, as reported at the Eleventh Census, are shown in the following summary:

SUMMARY OF STATISTICS OF THE CHEMICAL INDUSTRY: 1890.

Number of establishments reporting	1,626
Capital:	
Direct investment	$168,462,044
Value of hired property	$12,098,037
Miscellaneous expenses	$13,640,343
Average number of employés (aggregate)	43,701
Total wages	$25,321,077
Officers, firm members, and clerks:	
Average number	5,953
Total wages	$7,464,260
All other employés:	
Average number	37,748
Total wages	$17,856,817
Cost of materials used	$106,521,980
Value of products	$177,811,833

PRINCIPAL PRODUCTS REPORTED, THEIR QUANTITY AND VALUE: 1890.

PRODUCTS.	Quantity.	Value.
Total		$177,811,833
Alum ..... lbs.	93,098,008	1,616,710
Coal tar products		687,591
Dyeing and tanning extracts and sumac ..... lbs.	187,906,911	8,857,084
Gunpowder and other explosives ..... lbs.	125,645,912	10,993,131
Fertilizers ..... tons.	1,898,806	35,519,841
Paints, colors, and varnishes		52,908,252
Pharmaceutical preparations		16,744,643
Potash and pearlash ..... lbs.	5,106,939	197,507
Sodas ..... lbs.	333,124,375	5,432,400
Sulphuric acid (a) ..... lbs.	1,384,776,972	5,198,978
Wood alcohol and acetate of lime		1,885,469
Chemicals (including all acids, bases, and salts not heretofore enumerated)		24,751,974
All other products		13,018,253

a Includes 581,536,200 pounds manufactured and consumed in the manufacture of fertilizers for which no value is given as sulphuric acid.

Table 1 is a comparative statement giving the results of the inquiry in detail of items common to the censuses of 1880 and 1890 by state totals.

A chemical plant may appear to be only a mass of rude furnaces, pots, and rough machinery, yet the establishment may contain appliances of the most costly description, such as underground flues; furnaces of the most modern construction; iron castings, fashioned in innumerable forms and weights; copper vessels, coils, and stills; thousands of fire bricks and other forms of refractory material; steam boilers of the most economical pattern; lofty chimneys; powerful engines; expensive pumps; mills of different forms for the grinding and powdering of a great variety of materials; leaden chambers for acid making, with tanks, towers, and accessories of the same metal, and chemical earthenware, vitrified to resist the action of acids.

A high degree of skill and scientific knowledge combined with the use of elaborate and expensive plants have now become essential to the successful manufacture of chemicals to an extent unthought of by those engaged in the industry 20 or even 10 years ago. The laboratory, well equipped with careful workers and good apparatus, has become the pulse of the whole establishment. Each step in the various processes is governed by the results obtained by the analyst and tester, while the huge and costly machinery of the factory is the counterpart, to a great extent, of the miniature equipment of the laboratory.

The materials used in chemical manufacture are of great variety and number, ranging from the crudest substances (atmospheric air being one of the most important) to those bearing the highest stamp of refinement. The precious metals, for example, yield salts that are invaluable in the materia medica and in photography and other arts. The products of many works are used solely as the materials for other processes that are carried on in separate and perhaps remote factories. The processes used in making chemicals are almost as varied as are the articles produced, but certain leading steps are essential to all, as grinding, furnacing, dissolving, separating, evaporating, filtration, and crystallization. The laws governing chemical constituents are closely followed at each step and the processes improved and revised from time to time by the aid of modern mechanical contrivances. These changes are rendered more and more necessary in the sharp competition of the age.

Many chemical operations demand a long time for the production of finished products. Crystallization is of slow growth in many instances, and decomposition takes place very gradually in others. Both crystallization and decomposition are hastened or retarded by many physical conditions. Heat and cold, intense motion, or absolute quietude are in their turn called to the aid of the chemist.

The method of inquiry at the Eleventh Census respecting capital was intended to develop the full amount of all classes of capital represented by money and by property of every kind, owned, borrowed, and hired, employed in the industry.

No previous census inquiry has embraced the cost incurred in manufacturing operations other than that of wages and materials. The current inquiry is intended to embrace all expenses of production with the exception of depreciation of plant. The difference between cost and the value of products, however, must not be taken as a correct indication of manufacturers' profits, because these statistics contain no information as to cost of selling, mercantile losses, and depreciation of plant.

Table 2 presents by totals for the different states and territories and for the United States detailed information concerning capital, miscellaneous expenses, employés and wages, materials used, and value of products, as reported at the Eleventh Census.

These tables show the quantity and value of the different articles manufactured. Of these special attention is called to the following: sulphuric acid; fertilizers; soda; paints, colors, and varnishes; alum; potash and pearlash; acetate of lime and wood alcohol, and chemicals used in pharmaceutical preparations.

SULPHURIC ACID.

Sulphuric acid is among the most important of chemical products. At the census of 1880, 49 establishments were reported as engaged in the manufacture of this acid, producing 308,765,432 pounds, valued at $3,661,876; in 1890 there were 105 establishments, manufacturing 1,384,776,972 pounds. Of this quantity, 581,536,200 pounds, estimated as being worth $2,480,495, were produced and consumed as an intermediate product by establishments engaged in the manufacture of fertilizers, making the total value of all sulphuric acid manufactured in the United States during the census year $7,679,473, an increase in value of 109.71 per cent over 1880 and in quantity of 348.49 per cent. The large increase in the number of establishments and the quantity produced, together with the reduction in price, indicates the advance that has been made in this branch of the industry in the United States during the last decade.

Under this heading there is given in the accompanying tables the production of 50° baumé sulphuric acid, 60° baumé sulphuric acid, and 66° baumé sulphuric acid (oil of vitriol).

A portion of the 50° baumé acid made in certain states is used as an intermediate product by establishments engaged in the manufacture of fertilizers. The value of such acid is not shown, as it is included in the value of fertilizers, and to attach a separate value to it would cause a duplication. Therefore, under the head of 50° baumé there is given in the column of pounds the total quantity manufactured.

The following statement gives the quantity of 50° baumé acid manufactured in the several states and used as an intermediate product in the manufacture of fertilizers:

SULPHURIC ACID PRODUCED AND CONSUMED BY ESTABLISHMENTS MANUFACTURING FERTILIZERS: 1890.

	POUNDS.
Total	581,536,200
Georgia	96,138,400
Maryland	155,900,800
Massachusetts	55,900,000
Michigan	7,275,600
New Jersey	5,000,000
North Carolina	6,192,000
Ohio	15,000,000
South Carolina	211,009,400
Virginia	29,120,000

The total quantity of 50° baumé acid produced in the United States was 1,009,863,407 pounds. Deducting from this the total shown in the above statement, 581,536,200 pounds, there remains a total of 428,327,207 pounds, the value of which is $1,826,572. This is equal to $8.53 per ton of 2,000 pounds. Applying this average value per ton to the total quantity of 50° baumé acid manufactured (1,009,863,407 pounds), a total value of $4,307,067 is obtained.

The quantity of 60° baumé acid manufactured in the United States during the census year was 20,379,908 pounds, valued at $122,940, equivalent to $12.06 per ton of 2,000 pounds.

The amount of 66° baumé acid made was 354,533,657 pounds, valued at $3,249,466, equivalent to $18.33 per ton of 2,000 pounds.

In order to obtain an intelligent idea of the extent of the sulphuric acid industry it is advisable to reduce the figures of the tables to a uniform basis, that of 66° baumé acid (oil of vitriol). As this contains from 93 to 94 per cent of real monohydrate acid ($H_2S\ O_4$), the reduction is made by multiplying the pounds of 50° baumé acid by $\frac{100}{150}$ and the pounds of 60° baumé acid by $\frac{100}{120}$. By so doing we obtain the results given in the following statement, the 50° baumé acid used in making fertilizers being included:

STRENGTH, BAUMÉ.	Pounds of acid as manufactured.	Equivalent to pounds of 66° acid.
	Total	1,044,759,185
50°	1,009,863,407	673,242,271
60°	20,379,908	16,983,257
66°	354,533,657	354,533,657

The total quantity of sulphuric acid produced in the United States reduced to a uniform strength of 66° baumé is accordingly 1,044,759,185 pounds, or 522,380 tons of 2,000 pounds each.

The reduction to a uniform strength of 50° baumé is made by multiplying the pounds of 60° baumé acid by 1.25 and the pounds of 66° baumé acid by 1.50. The following statement shows the result of this reduction:

STRENGTH, BAUMÉ.	Pounds of acid as manufactured.	Equivalent to pounds of 50° acid.
	Total	1,567,138,777
50°	1,009,863,407	1,009,863,407
60°	20,379,908	25,474,885
66°	354,533,657	531,800,485

Supposing all the chambers to be running 365 days in the year, we find the amount of 50° acid and equivalents manufactured in each 24 hours to be 4,293,531 pounds, or 2,147 tons.

FERTILIZERS.

Manufactured manure is next in importance to sulphuric acid in the category of chemical products. During the census year there were 392 establishments reported as engaged in the production of chemical fertilizers, manufacturing 1,898,806 tons valued at $35,519,841, as compared with 278 establishments manufacturing 727,453 tons valued at $19,921,400 at the census of 1880, being an increase in quantity of 161.02 per cent and in value of 78.30 per cent.

SODA.

In the last decade the manufacture of soda salts increased enormously in the United States. During the census year there were 32 establishments reported as manufacturing soda, with a product of 333,124,375 pounds, valued at $5,432,400. At the census of 1880 there were 40,259,938 pounds manufactured, valued at $866,560, the increase in quantity being 727.43 per cent and in value 526.89 per cent.

PAINTS, COLORS, AND VARNISHES.

A quantity of dry white lead and oxide of lead is manufactured and consumed by establishments engaged in the production of "paints in oil, in paste". While the quantity consumed in this manner is shown, its value is not given, as it is included in the value of "paints in oil, in paste".

The following statement shows the quantity of dry white lead and oxide of lead manufactured in the several states and used as an intermediate product in the manufacture of paints in oil, in paste:

DRY WHITE LEAD AND OXIDE OF LEAD REMANUFACTURED BY ESTABLISHMENTS ENGAGED IN THE MANUFACTURE OF PAINTS IN OIL, IN PASTE: 1890.

	POUNDS.
Total	80,915,582
California (dry white lead)	7,000,000
Illinois (dry white lead)	7,170,997
Kentucky (dry white lead)	1,305,460
Missouri (dry white lead)	29,003,259
Nebraska (dry white lead)	6,585,000
Ohio (dry white lead)	19,271,791
Pennsylvania (dry white lead)	10,266,823
Missouri (oxide of lead)	312,252

The entire production of dry white lead and oxide of lead in the United States was 168,282,478 pounds. Deducting from this the total given in the above statement, there remains a total of 87,366,896 pounds manufactured and sold dry to the trade, the value of which is $4,536,204.

During the census year there were 27 establishments reported as engaged in the manufacture of white lead. The quantity manufactured was 143,620,471 pounds as compared with a product of 123,477,890 pounds in 1880, an increase of 16.31 per cent. The average value per pound has declined from 7.1 cents in 1880 to 5.2 cents in 1890.

The number of establishments manufacturing barytes in 1890 was 13, with an output of 43,143,000 pounds, valued at $377,939. The number of pounds reported at the census of 1880 was 38,330,000, valued at $371,829. The increase in quantity of 1890 over 1880 was 12.56 per cent and in value 1.64 per cent.

The number of establishments manufacturing oxide of zinc either as a principal product or as a by-product in 1890 was 7, reporting a product of 17,648,000 pounds, valued at $695,920, as compared with 20,121,761 pounds, valued at $766,337, in 1880, a decrease in quantity of 12.29 per cent and in value of 9.19 per cent.

ALUM.

During the census year there were 10 establishments reported as engaged in the manufacture of alum either as a principal or as an incidental product. The quantity manufactured was 93,998,008 pounds, valued at $1,616,710, as compared with 39,217,725 pounds, valued at $808,165, reported at the census of 1880. The increase in quantity was 139.68 per cent and in value 100.05 per cent.

POTASH AND PEARLASH.

The manufacture of potash and pearlash by the leaching of wood ashes shows but an insignificant increase from 1880 to 1890, which is due, to some extent, to the substitution for it of caustic soda and soda ash. The number of establishments engaged in its manufacture in 1890 was 75 and in 1880, 68. The total quantity manufactured in 1890 was 5,106,939 pounds, valued at $197,507, and in 1880, 4,571,671 pounds, valued at $232,643, an increase in quantity of 11.71 per cent and a decrease in value of 15.10 per cent.

ACETATE OF LIME AND WOOD ALCOHOL.

In 1890 there were 53 establishments engaged in the manufacture of acetate of lime and crude methylic or wood alcohol, manufacturing a product of 26,778,415 pounds of acetate of lime, valued at $315,430, and crude wood alcohol to the value of $613,607. In 1880 there were 17 establishments engaged in this branch of the chemical industry, manufacturing 6,593,009 pounds of acetate of lime, valued at $156,892, and wood alcohol, crude, valued at $86,274. The increase of 1890 over 1880 in acetate of lime was 306.16 per cent in quantity and 101.05 per cent in value, and in crude wood alcohol the increase in value was 611.23 per cent. It should be stated in this

connection that the quantity of crude wood alcohol, 949,733 gallons, shown in the tables, does not represent the entire quantity manufactured. It does not include 166,342 gallons, the product of 4 establishments that did not sell their product in its crude condition, but refined it, it being in such cases reported as wood alcohol, refined. This quantity would increase the production in the United States to 1,116,075 gallons.

COMPRESSED AMMONIA GAS OR ANHYDROUS AMMONIA.

The use of compressed ammonia gas has reached large proportions in the last decade, and has proved a valuable aid in the preservation of food, the refrigeration of malt liquors, and the manufacture of ice. The introduction of the use of anhydrous ammonia has given great impetus to the manufacture of the special machinery adapted to its employment in the departments named. Taken as a whole, its manufacture may be classed as a distinct branch of industry.

CHEMICALS USED IN THE DYEING AND FINISHING OF TEXTILES.

It appears from the report for the Eleventh Census on the dyeing and finishing of textiles, considered as a distinct industry, prepared by Mr. P. T. Wood, that chemicals and dyestuffs to the value of $8,407,693 were consumed by the 248 establishments engaged in this industry, to which must be added $11,357,489, the value of chemicals and dyestuffs consumed during the census year by textile manufacturers who do their own dyeing and finishing, making a total of $19,765,182 as the value of this class of chemicals consumed in the textile industry.

PHARMACEUTICAL PREPARATIONS.

Pharmaceutical preparations, which are produced in consequence of the demand for more palatable material for the materia medica, cover a large field, including pills, lozenges, fluid extracts, and a great variety of elixirs.

The producers of these articles have succeeded in most instances in masking or altogether obliterating the unpleasant properties of drugs, and have developed an industry of great commercial importance.

FUEL.

The chemical industry is a large consumer of fuel, hence great interest attaches to its supply. Its expense is of great importance in computing the costs of these manufactures.

Many fuel saving devices are to be found in chemical works, and within the past 2 or 3 years fuel oil has become of considerable importance. Natural gas, also, has been utilized in chemical works in localities adjacent to a supply, and its use has proved a great convenience.

EMPLOYÉS AND WAGES.

Statistics relating to employés and wages are presented in detail in Tables 3 and 4. Table 3 gives employés by classes, namely: officers and firm members actively engaged in the industry or in supervision; clerks; operatives and skilled workmen and unskilled workmen; the average number of males, females, and children, respectively, with the average weekly earnings and the total wages in the respective classes; also pieceworkers, with their earnings. Table 4 gives the weekly rates of wages paid, with the average number of employés at each rate (not including pieceworkers), for men, women, and children, respectively, and the number of pieceworkers with their earnings.

The average number of employés is the number necessary to be continually employed during the time the establishment is reported as being in operation in the census year to perform the work of a varying number.

Upon this basis the computations are made to obtain "the average weekly earnings". The number of weeks reported by individual establishments as their term of operation is multiplied by the average number of employés; the product is the number of weeks required for 1 employé to perform the labor. The sum of these products of individual establishments divided into the sum of the wages for the same establishments produces the true average weekly earnings per employé.

In making comparisons of average weekly earnings in the different states the character of their principal product should be considered. The nature of the products embraced by the classification "chemicals and allied products" is varied, requiring in some instances the highest skill and care in their manufacture, and in others the most ordinary class of labor, including but few skilled or high priced workmen.

The following statement presents totals concerning employés and wages, and shows the average number of men, women, and children in each 100 employés; also the percentage that the wages of each group is of the total wages for the industry during the census year:

EMPLOYÉS.	Average number.	Total wages.	Number in each 100 employés.	Percentage of total wages.
Total	43,701	$25,321,077	100	100.00
Males above 16 years	39,372	24,093,919	90	95.15
Females above 15 years	3,983	1,171,974	9	4.63
Children	346	55,184	1	0.22

In the following statement the employés are presented by classes, as shown in Table 3, with the number of each class in each 100 employés; also the percentage that the wages of each class is of the total wages:

EMPLOYÉS.	Average number.	Total wages.	Number in each 100 employés.	Percentage of total wages.
Total	43,701	$25,321,077	100	100.00
Officers or firm members	2,262	3,725,971	5	14.72
Clerks	3,691	3,738,289	9	14.76
Operatives and skilled employés	20,561	10,767,713	47	42.52
Unskilled employés	15,467	6,425,614	35	25.38
Pieceworkers	1,720	663,490	4	2.62

The inquiry at the Eleventh Census divided wage earners proper into three classes: first, operatives, engineers, and other skilled workmen, overseers and foremen, or superintendents (not general superintendents or managers); second, watchmen, laborers, teamsters, and other unskilled workmen; third, pieceworkers.

It appears from the above statements that a very small proportion of women and children are employed in the chemical industry, and that 47 per cent of the employés are skilled and 35 per cent unskilled, the pieceworkers being comparatively few in number.

DISTILLED SPIRITS CONSUMED IN THE ARTS, MANUFACTURES, AND MEDICINE IN THE UNITED STATES.

Inasmuch as the cost of distilled spirits constitutes the largest outlay in the manufacture of pharmaceutical preparations, an investigation into the quantity of alcohol used for this purpose becomes invaluable.

Tables 5, 6, 7, and 8 show the total consumption of each form of distilled spirits in the United States, by totals for states and territories, as compiled from the returns of manufacturers and wholesale druggists, eleemosynary institutions, and retail apothecaries. The total consumption of all forms of distilled spirits amounted to 10,976,842 proof gallons.

Previous statements concerning the quantity of distilled spirits consumed in the arts, manufactures, and medicine were merely estimates, whereas the quantities given in these tables are the results from definite returns.

The estimates were founded principally upon two bases: first, the quantity of alcohol consumed in the arts, manufactures, and medicine in the United States; and, second, the quantity of distilled spirits of all kinds so consumed.

Concerning the amount of alcohol alone so consumed the Secretary of the Treasury, in his annual report of December 2, 1889 (page xxix), estimated the amount at about 6,000,000 proof gallons.

While of all forms of distilled spirits alcohol is that which is most largely used in the arts, it would nevertheless be a serious error to assume that it is the only form of distilled spirits so consumed. Cologne spirit is used for many purposes for which alcohol, on account of containing certain impurities, would be unsuitable. This is particularly true in relation to the preparation of a large number of fine chemicals. Whisky, brandy, rum, and gin are likewise used in the manufacture of proprietary medicines and certain pharmaceutical preparations, such as tinctures and medicinal wines.

The Statistical Abstract of the United States, prepared by the Bureau of Statistics under the direction of the Secretary of the Treasury, gives the quantity of distilled spirits consumed in the country as 80,613,158 gallons in 1889.

There are no estimates of so high authority for the quantity used of other forms of distilled spirits as that of the Secretary of the Treasury for the quantity of alcohol used, but an estimate of 15 per cent of all distilled spirits consumed as used in the arts and manufactures would be equivalent to 12,000,000 gallons in round numbers.

THE METHOD ADOPTED BY THE CENSUS OFFICE IN MAKING THIS INVESTIGATION.

In entering upon this investigation two difficulties were encountered. In the first place, the use of distilled spirits for manufacturing and medicinal purposes is so widespread and extends into so many and such varying industries that the problem of obtaining statistics thereof is a very difficult one. In the second place, the same quantity or lot of distilled spirits is frequently handled by several firms. It therefore became necessary to adopt some means of preventing duplication of returns by these several establishments. It was evident that grave errors would enter into an investigation of this kind unless great care was taken to avoid such duplication. A thousand gallons of alcohol, for instance, handled by a wholesale drug house would appear in its return. A certain part of this, it may be assumed, was sold by the wholesale firm to a retail apothecary. The latter in filling out the census schedule would report this quantity as handled by him. There would in this instance be an error amounting to the quantity handled by the retail apothecary.

To surmount the difficulty each establishment was requested not only to report the quantity of distilled spirits consumed and sold but also to state the source whence bought. For this purpose there was inserted in each schedule prepared for this inquiry a special column, headed "State whether bought from liquor trade or other trade", this statement to apply to each form of distilled spirits enumerated.

In tabulating the returns the quantities reported as purchased from the liquor trade were tabulated separately from those purchased from other sources, and in the final summing up of the investigation the only figures used were those which represented the quantities purchased direct from the liquor trade. The returns from the above mentioned retail apothecary, for example, would thus be excluded from the final result, inasmuch as his return showed that his purchases had been made from the wholesale drug trade. In this manner duplication of quantities was avoided.

The establishments to which schedules were sent were divided into the following classes for the sake of convenience: manufacturers and wholesale druggists, eleemosynary institutions (dispensaries, homes, asylums, and others of like nature), and retail apothecaries.

Separate schedules were used for these classes, special care being taken to adapt each form of schedule to the requirements of the establishments to be returned thereon. Particular instructions were given not to enumerate distilled spirits used as a beverage. The entire number of schedules sent out was about 400,000.

The result of the inquiry has shown that the total quantity of distilled spirits consumed in the arts, manufactures, and medicine in the United States during the 12 months ending December 31, 1889, was 10,976,842 proof gallons. The figures for each form of spirits will be found in the tables.

The following summary gives the returns in proof gallons for the entire United States of the wholesale druggists and manufacturers, eleemosynary institutions, and retail apothecaries:

PROOF GALLONS OF DISTILLED SPIRITS CONSUMED IN THE ARTS, MANUFACTURES, AND MEDICINE DURING THE YEAR ENDING DECEMBER 31, 1889.

RETURNS RECEIVED FROM—	Aggregate.	Alcohol.	Cologne spirit.	High wines.	Whisky.	Brandy.	Rum.	Gin.
Total	10,976,842	6,745,152	1,453,048	75,992	2,023,900	266,874	189,581	222,295
Manufacturers and wholesale druggists	7,966,640	5,425,791	1,334,033	54,737	879,282	100,482	87,378	84,937
Eleemosynary institutions	102,790	30,092	4,374	883	59,222	6,599	841	779
Retail apothecaries	2,907,412	1,289,269	114,641	20,372	1,085,396	159,793	101,362	136,579

Table 5 gives the returns in proof gallons by totals for states of all forms of distilled spirits consumed or sold by manufacturers and wholesale druggists, eleemosynary institutions, and retail apothecaries combined.

Table 6 gives the returns of manufacturers and wholesale druggists by totals for states in ordinary gallons and in proof gallons as reported.

Table 7 gives the returns of eleemosynary institutions by totals for states in ordinary gallons and in proof gallons as reported.

Table 8 gives the returns of retail apothecaries by totals for states in ordinary gallons and in proof gallons as reported.

In converting ordinary to proof gallons the factors furnished by the internal revenue department at Washington, D. C., were used. The average strength of alcohol and of cologne spirit has been taken at 1.88, or in other words, at 88 per cent above proof; that of high wines at 1.50, or 50 per cent above proof; whisky, brandy, rum, and gin have been taken as at proof.

Attention is called to the fact that the total quantity of alcohol consumed is 6,745,152 proof gallons. According to the report of the commissioner of internal revenue for the 12 months ending June 30, 1889, 10,739,734 proof gallons of alcohol represented the total quantity withdrawn from bond on payment of the tax. Inasmuch as

only 6,745,152 proof gallons are accounted for as the result of this inquiry, it is evident that the remainder, 3,994,582 proof gallons, represents (1) a certain amount used in the arts and which has not been reported to the Census Office, and (2) a certain amount used for drinking purposes.

It has been the endeavor to obtain, as far as possible, such facts as relate to the use of alcohol as a beverage. It appears that, as such (in some cases diluted with water), it is used to a great extent by Poles, Norwegians, Swedes, Finns, Hungarians, and Russians. Inquiry of some of the large houses in the northwest familiar with this particular trade elicits the information that fully one-half of the alcohol sold in that section is used as the favorite beverage of the people mentioned above. It is estimated that about 15 barrels of alcohol are daily consumed for this purpose in New York city alone. A considerable amount is consumed by the foreign element in the coal regions of Pennsylvania.

It is impossible to obtain statistics of a reliable nature bearing upon this outlet for alcohol. It is, however, safe to assert that the quantity unaccounted for by the inquiry is largely consumed by the trade, and that the figures obtained of the quantity of alcohol consumed in the arts, manufactures, and medicine are substantially correct. If they err at all, they are probably somewhat below the truth.

TABLE 1.—COMPARATIVE STATEMENT, CHEMICALS AND ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1880 AND 1890.

STATES AND TERRITORIES.	Year.	Number of establishments reporting.	Capital. (a)	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES. (b)					COST OF MATERIALS USED.		
				Aggregates.		Males above 16 years.	Females above 15 years.	Children.	Total.	Fuel.	All other materials.
				Average number.	Total wages.						
The United States	1880	1,349	$85,394,211	29,520	$11,840,704	26,776	1,493	1,251	$77,494,425	$1,882,317	$75,612,108
	1890	1,626	168,462,044	43,701	25,321,077	39,372	3,983	346	106,521,989	2,670,290	103,851,690
Alabama	c1880										
	1890	11	763,075	350	101,358	343	6	1	695,648	10,035	505,613
California	1880	42	2,406,350	573	282,614	548	16	9	2,119,078	58,391	2,060,687
	1890	36	4,293,574	832	603,465	804	22	6	2,682,848	164,170	2,518,678
Colorado	1880	2	36,000	20	18,200	18	2		49,000	1,162	47,838
	1890	6	196,300	64	48,141	63	1		401,518	2,928	398,590
Connecticut	1880	41	1,434,250	540	270,754	506	30	4	1,822,435	59,269	1,763,166
	1890	28	4,349,296	865	503,131	859	6		2,471,501	58,115	2,413,386
Delaware	1880	23	931,379	539	100,026	370	142	27	809,074	14,004	795,070
	1890	23	3,242,089	588	265,664	587	1		1,565,081	30,381	1,534,700
District of Columbia	1880	12	205,967	134	46,875	132		2	216,919	4,796	212,123
	1890	5	98,191	45	18,966	45			92,350	3,315	89,035
Florida	1880	1	700	2	315	2			500		500
	1890	3	14,705	28	9,905	28			74,075	50	74,025
Georgia	1880	4	245,000	89	28,377	82		7	209,600		209,600
	1890	49	5,706,531	1,528	527,325	1,509	12	7	3,184,670	55,751	3,128,919
Illinois	1880	52	3,348,550	1,463	571,417	1,293	72	98	5,935,430	81,171	5,854,259
	1890	86	7,833,644	1,815	1,311,991	1,638	165	12	5,196,842	80,927	5,115,855
Indiana	1880	16	102,700	73	23,116	73			89,544	3,084	86,460
	1890	19	473,852	246	152,825	190	56		572,141	7,668	564,473
Iowa	1880	17	219,600	117	34,020	108	6	3	178,710	3,535	175,175
	1890	5	68,900	35	17,820	35			35,249	1,074	34,175
Kansas	1880	12	68,000	45	12,992	43		2	128,100	1,679	126,421
	1890	3	213,428	57	32,539	52	5		65,080	3,257	61,823
Kentucky	1880	15	712,440	184	63,475	157	27		467,073	12,610	455,363
	1890	16	680,795	236	114,593	194	41	1	471,591	6,380	465,211
Louisiana	1880	7	218,701	100	45,043	87	8	5	156,007	2,000	154,007
	1890	6	707,847	158	83,605	143	15		309,941	5,849	304,092
Maine	1880	24	398,480	161	53,461	161			328,541	15,433	313,108
	1890	23	670,922	202	91,463	199	3		341,868	16,388	325,480
Maryland	1880	60	5,578,302	1,380	535,125	1,361		19	4,625,637	135,627	4,490,010
	1890	89	8,850,038	1,965	1,044,516	1,704	259	2	5,100,529	111,670	4,988,859
Massachusetts	1880	179	6,828,473	2,143	953,784	2,016	63	64	7,390,703	151,776	7,238,927
	1890	112	7,271,883	1,984	1,235,319	1,821	160	3	5,265,696	148,415	5,117,281
Michigan	1880	38	258,692	204	65,158	198	2	4	177,985	6,627	171,358
	1890	83	5,070,078	2,159	1,064,359	1,524	623	12	3,409,098	36,122	3,372,976
Minnesota	1880	6	113,500	37	19,024	30	7		115,100		115,100
	1890	9	337,314	168	85,667	105	21	42	413,193	2,016	411,177
Missouri	1880	39	3,415,300	1,174	542,769	1,114	31	29	4,056,274	79,297	3,976,977
	1890	54	5,780,161	1,320	845,281	1,138	166	16	4,182,838	80,856	4,101,982
Nebraska	1880	7	119,300	74	24,936	65	2	7	210,320	4,122	206,198
	1890	4	424,317	99	66,057	94	3	2	369,917	10,174	359,743
Nevada	1880	7	274,500	53	33,670	53			37,075		37,075
	1890	4	393,460	185	67,065	185			75,840	16,180	59,660
New Hampshire	1880	20	80,600	50	19,849	49	1		48,660		48,660
	d1890										
New Jersey	1880	62	7,371,400	2,655	1,172,654	2,345	78	232	6,088,296	239,926	5,848,370
	1890	124	19,895,868	4,621	2,936,376	4,253	352	16	11,868,432	377,063	11,490,769
New York	1880	217	20,141,586	6,251	2,901,960	5,552	429	270	20,418,018	367,943	20,050,075
	1890	290	37,207,773	10,593	6,682,971	9,188	1,321	84	26,983,638	665,667	26,317,971
North Carolina	1880	1	350,000	125	40,000	100		25	150,000		150,000
	1890	15	1,677,730	428	141,730	416	2	10	686,281	13,584	672,697
Ohio	1880	92	5,961,003	1,803	706,434	1,541	140	122	5,075,395	101,263	4,974,132
	1890	128	9,715,266	2,263	1,465,012	2,092	140	31	6,009,602	123,097	5,877,505
Oregon	1880	2	22,000	8	3,700	8			10,000		10,000
	1890	4	161,250	55	54,270	49	6		264,100	400	263,700
Pennsylvania	1880	181	18,349,930	4,796	2,151,799	4,273	336	187	13,085,892	398,596	12,687,296
	1890	248	31,741,167	7,595	4,380,165	6,961	548	86	17,303,351	466,631	16,836,720
Rhode Island	1880	41	1,291,136	687	274,657	605	74	8	1,169,202	50,711	1,118,491
	1890	16	561,303	208	145,151	204	4		531,206	20,388	510,818
South Carolina	1880	29	3,496,300	2,760	577,100	2,680	10	70	1,297,704	63,975	1,233,729
	1890	21	5,908,218	1,217	514,055	1,215	1	1	2,783,157	97,056	2,686,101
Tennessee	1880	9	127,600	65	14,406	64		1	39,114	2,324	36,790
	1890	14	698,728	182	85,403	162	20		269,546	10,200	259,346
Texas	1880	6	30,000	19	9,488	16		3	12,825		12,825
	1890	10	84,359	66	45,477	64		2	122,876	531	122,345
Vermont	1880	11	195,900	95	23,422	95			27,340	155	27,185
	1890	6	61,976	42	12,743	41	1		22,777	420	22,357
Virginia	1880	38	645,700	828	125,010	795	3	30	528,675	4,600	524,075
	1890	46	2,317,992	1,140	412,186	1,123	6	11	2,083,303	26,715	2,056,588
West Virginia	1880	9	140,900	103	32,999	93		10	73,006	8,543	64,463
	1890	8	146,800	132	45,556	131		1	110,533	4,515	106,018
Wisconsin	1880	24	251,972	163	57,397	136	14	13	320,651	9,620	311,031
	1890	17	564,010	156	82,180	139	17		297,399	9,872	287,527
All other states	1880	e3	22,000	7	3,778	7			25,642	78	25,564
	1890	f5	215,604	74	26,748	74			307,265	1,770	305,495

a Value of property hired is not included in the capital reported in 1890, because it was not included in the report of 1880.
b The figures for 1890 include officers, firm members, and clerks, while the report for 1880 states that these classes were not included at the Tenth Census.
c No reports received from this state in 1880.
d No reports received from this state in 1890.
e Embraces establishments distributed as follows: Utah, 2; Washington, 1.
f Embraces establishments distributed as follows: Arkansas, 1; Mississippi, 3; Washington, 1.

TABLE I.—COMPARATIVE STATEMENT, CHEMICALS AND ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1880 AND 1890—Continued.

STATES AND TERRITORIES.	Year.	PRODUCTS. Total value.	Alum.		Fertilizers.		White lead.		Barytes. (Ground or floated.)		Oxide of zinc.	
			Pounds.	Value.	Tons.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
The United States	1880	$117,377,324	39,217,725	$808,165	727,453	$19,921,400	123,477,890	$8,770,699	38,330,000	$371,829	20,121,761	$766,337
	1890	177,811,833	93,998,008	1,610,710	1,898,806	35,519,841	a143,620,471	3,297,627	43,143,000	377,939	17,648,000	695,920
Alabama	1880											
	1890	949,300			29,150	666,500						
California	1880	3,179,700			1,000	20,000	4,000,000	260,000				
	1890	5,312,313			6,100	175,500	7,000,000					
Colorado	1880	95,000										
	1890	539,910			50	1,000						
Connecticut	1880	2,419,743			7,475	248,050			12,000,000	150,000		
	1890	3,977,301			12,690	267,450			8,400,000	67,000		
Delaware	1880	1,140,086			37,917	998,165						
	1890	2,403,071			48,241	1,018,170						
District of Columbia	1880	322,489			6,300	199,000						
	1890	135,100			4,640	93,300						
Florida	1880	1,120										
	1890	86,137			3,135	86,137						
Georgia	1880	353,500			11,287	341,500						
	1890	5,209,784			230,207	4,553,709						
Illinois	1880	7,081,325			27,015	633,990	7,880,079	480,181				
	1890	8,876,391			33,819	957,718	14,827,424	404,633	200,000	12,000	400,000	16,000
Indiana	1880	156,470			1,574	44,877						
	1890	992,586			7,366	216,812						
Iowa	1880	287,743			960	13,000						
	1890	66,300			100	2,000						
Kansas	1880	186,233										
	1890	163,188										
Kentucky	1880	726,255			1,665	42,000	2,365,000	176,550				
	1890	773,867			10,268	255,116	1,381,522	4,183				
Louisiana	1880	320,659			1,823	68,106						
	1890	451,678			11,773	263,678						
Maine	1880	563,517			5,850	175,000			4,400,000	50,000		
	1890	535,267			3,998	63,570						
Maryland	1880	7,243,122			191,571	5,457,258	3,240,000	240,000				
	1890	8,243,413			366,422	6,042,442	1,580,000	82,458				
Massachusetts	1880	10,604,662			69,387	1,920,623	4,758,521	360,073				
	1890	8,679,630	2,340,000	35,000	91,502	1,922,113						
Michigan	1880	363,104			900	27,000						
	1890	6,600,191			18,715	301,025						
Minnesota	1880	220,540			600	12,000						
	1890	731,090			1,700	86,000						
Missouri	1880	5,827,498			5,905	146,932	26,400,324	1,813,600	8,850,000	100,094	660,000	29,700
	1890	6,813,484			11,496	207,806	29,003,259		19,972,000	209,000	2,400,000	101,000
Nebraska	1880	387,000			470	4,700	3,000,000	350,000				
	1890	533,315					6,585,000					
Nevada	1880	283,532										
	1890	208,300										
New Hampshire	1880	108,911										
	1890											
New Jersey	1880	9,499,577	6,378,550	91,961	80,859	2,290,202					16,774,756	654,051
	1890	19,826,774	7,191,200	134,468	169,193	3,973,112					7,348,000	293,920
New York	1880	20,805,614	3,750,000	70,000	88,336	2,636,150	28,144,009	1,951,507				
	1890	44,355,944	12,454,000	231,050	177,982	3,168,467	31,755,390	1,540,396	600,000	6,000		
North Carolina	1880	300,000			12,000	300,000						
	1890	1,079,492			54,424	938,755			4,800,000	31,600		
Ohio	1880	7,678,374			13,365	377,025	13,140,458	967,321			30,405	2,888
	1890	10,653,685			53,062	1,163,784	19,271,791				500,000	22,500
Oregon	1880	24,000										
	1890	430,000										
Pennsylvania	1880	20,884,991	29,080,175	646,204	53,507	1,432,345	30,540,499	2,153,467	3,000,000	20,000	2,656,600	79,698
	1890	28,724,441	72,012,808	1,216,192	73,946	1,603,431	32,216,085	1,265,957	291,000	1,455	7,000,000	262,500
Rhode Island	1880	1,068,041			11,979	156,427						
	1890	856,765			4,000	99,000						
South Carolina	1880	2,693,053			64,704	1,537,230						
	1890	4,527,158			293,806	4,379,033						
Tennessee	1880	121,520			314	12,670						
	1890	531,194			8,200	221,400			930,000	10,685		
Texas	1880	37,675										
	1890	199,900			33	925						
Vermont	1880	101,496										
	1890	49,698										
Virginia	1880	1,007,166			28,921	791,341			9,150,000	41,050		
	1890	3,108,800			154,497	2,407,738			8,880,000	50,884		
West Virginia	1880	209,310			629	16,300						
	1890	254,720			2,200	47,500						
Wisconsin	1880	521,388			1,050	19,500						
	1890	539,037			286	10,000						
All other states	1880	43,960										
	1890	392,600			15,805	326,650						

a Includes an intermediate product of 80,663,330 pounds for which no value is reported; for state distribution see note a, Table 2, page 292.

TABLE 1.—COMPARATIVE STATEMENT, CHEMICALS AND ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1880 AND 1890—Continued.

STATES AND TERRITORIES.	Year.	PRODUCTS—continued.								
		Acetate of lime.		Potash and pearlash.		Soda.		Sulphuric acid.		All other products.
		Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Value.
The United States	1880	6,593,009	$156,892	4,571,671	$232,643	40,259,938	$866,560	308,765,432	$3,661,876	$81,820,923
	1890	26,778,415	315,430	5,106,939	197,507	333,124,375	5,432,400	a1,384,776,972	5,198,978	125,159,481
Alabama	1880									
	1890									
California	1880							4,000,000	20,000	262,800
	1890							5,105,995	129,195	2,770,505
Colorado	1880					10,686,350	122,195	21,199,833	244,567	4,770,051
	1890									95,000
Connecticut	1880							1,200,000	30,000	508,910
	1890							5,163,669	53,500	1,968,193
Delaware	1880							11,000,000	61,500	3,581,351
	1890									141,921
										1,384,901
District of Columbia	1880							400,000	5,000	118,430
	1890									41,800
Florida	1880									1,120
	1890									
Georgia	1880									12,000
	1890							146,942,400	126,230	529,845
Illinois	1880							4,140,000	62,000	6,496,154
	1890					14,623,392	179,500	30,690,000	170,400	7,136,140
Indiana	1880			232,500	11,625					99,968
	1890			71,375	2,855	400,000	5,000			767,919
Iowa	1880									274,743
	1890									64,300
Kansas	1880									186,233
	1890									163,188
Kentucky	1880									507,705
	1890									514,568
Louisiana	1880							1,050,000	15,750	245,803
	1890									188,000
Maine	1880			279,299	14,010			2,000,000	35,000	289,507
	1890			211,030	8,323			2,363,649	18,088	444,686
Maryland	1880	224,000	6,720					43,920,000	340,840	1,189,304
	1890					3,739,982	36,659	185,623,400	372,400	1,709,454
Massachusetts	1880	135,000	3,500					23,016,881	326,666	7,993,800
	1890					552,400	4,405	66,948,000	82,951	6,635,161
Michigan	1880	1,500,000	30,000	1,393,962	62,542			980,000	4,916	238,646
	1890	3,135,652	20,303	2,995,259	107,469			7,275,600		6,171,394
Minnesota	1880			146,000	5,840					202,700
	1890									645,099
Missouri	1880							2,880,000	57,600	3,679,572
	1890							4,200,000	49,600	6,246,078
Nebraska	1880									32,300
	1890									533,315
Nevada	1880					1,800,000	16,560	1,440,000	16,540	250,432
	1890							1,600,000	32,000	176,300
New Hampshire	1880									108,911
	1890									
New Jersey	1880	80,000	1,800					74,994,625	693,113	5,768,450
	1890					278,640	2,688	195,464,006	1,395,181	14,117,405
New York	1880	3,171,544	78,086	515,500	23,442			41,363,543	438,723	24,607,697
	1890	11,857,857	146,811	627,525	23,328	258,111,672	4,400,041	105,827,459	878,303	33,961,548
North Carolina	1880									
	1890							28,192,200	50,600	58,537
Ohio	1880			493,229	20,761			24,200,000	386,000	5,924,379
	1890			1,201,750	55,532	7,921,110	71,390	79,528,862	483,440	8,857,039
Oregon	1880									24,000
	1890									430,000
Pennsylvania	1880	1,260,000	30,650			38,459,938	850,000	66,346,819	937,522	14,735,105
	1890	11,772,906	147,616			36,810,829	610,522	211,691,163	1,008,775	22,607,993
Rhode Island	1880	45,000	2,250					9,500,000	130,000	1,679,364
	1890							12,602,000	114,378	643,387
South Carolina	1880									1,155,823
	1890							218,463,400	21,765	126,360
Tennessee	1880									98,165
	1890							7,000,000	35,000	274,794
Texas	1880									37,075
	1890									198,975
Vermont	1880	177,465	3,886							97,610
	1890									49,098
Virginia	1880							897,000	9,000	165,775
	1890							37,120,000	32,000	618,178
West Virginia	1880							1,367,400	20,511	172,499
	1890							3,240,000	30,000	177,220
Wisconsin	1880			1,511,181	94,423					407,465
	1890	12,000	700					2,600,000	31,200	497,137
All other states	1880									43,960
	1890									65,950

a Includes an intermediate product of 581,536,200 pounds for which no value is reported; for state distribution see note a, Table 2, page 296.

TABLE 2.—DETAILED STATEMENT, CHEMICALS AND

	STATES AND TERRITORIES.	Number of establishments reporting.	CAPITAL.							
				Direct investment.						
			Value of hired property.	Aggregate.	Value of plant.				Live assets.	
					Total.	Land.	Buildings.	Machinery, tools, and implements.	Total.	Raw materials.
1	The United States	1,626	$12,098,037	$168,462,044	$72,640,007	$17,100,441	$26,228,463	$29,311,103	$95,822,037	$19,299,270
2	Alabama	11	8,050	763,075	198,770	14,020	81,550	102,600	564,305	31,330
3	California	36	351,235	4,293,574	2,064,802	641,700	405,587	1,017,515	2,228,772	750,370
4	Colorado	6	65,435	196,300	73,400	12,500	27,000	33,900	122,900	44,900
5	Connecticut	28	100,752	4,346,296	1,809,594	417,600	973,100	418,894	2,536,702	485,445
6	Delaware	23	34,774	3,242,089	1,248,375	300,875	645,500	302,000	1,993,714	307,400
7	District of Columbia	5	46,926	98,191	35,380	3,000	2,000	30,380	62,811	14,390
8	Florida	3	7,500	14,705	5,500	300	3,450	1,750	9,205	7,125
9	Georgia	49	87,800	5,706,531	1,780,287	255,016	836,713	688,558	3,926,244	377,632
10	Illinois	86	1,202,080	7,833,644	3,023,020	912,519	974,957	1,135,544	4,810,624	977,933
11	Indiana	19	52,200	473,852	155,096	24,090	69,821	61,185	318,756	96,109
12	Iowa	5	10,500	68,900	37,600	3,150	19,800	14,650	31,300	18,200
13	Kansas	3	.....	213,428	144,928	19,367	53,700	71,861	68,500	19,000
14	Kentucky	16	50,500	680,795	290,027	96,247	118,000	76,380	390,168	58,099
15	Louisiana	6	20,000	707,847	174,500	26,000	81,500	67,000	533,347	115,347
16	Maine	23	40,577	670,922	333,330	130,000	57,950	145,380	337,592	83,854
17	Maryland	89	600,000	8,856,038	2,660,831	585,975	1,159,600	915,256	6,195,207	670,650
18	Massachusetts	112	850,000	7,271,883	2,122,765	381,237	757,245	984,283	5,149,118	852,076
19	Michigan	83	162,902	5,070,678	1,848,847	391,055	676,735	780,457	3,221,831	737,930
20	Minnesota	9	160,000	337,314	30,210	100	100	30,010	307,104	67,430
21	Missouri	54	358,846	5,780,161	2,621,344	802,952	813,053	1,005,339	3,158,817	366,993
22	Nebraska	4	31,460	424,317	197,502	79,000	29,500	89,002	226,815	44,783
23	Nevada	4	8,500	393,460	256,368	163,470	27,500	65,398	137,092	113,000
24	New Jersey	124	1,332,570	19,895,868	9,587,281	2,286,456	3,871,631	3,429,194	10,308,587	2,438,174
25	New York	290	3,973,000	37,207,773	17,335,165	3,843,324	6,026,558	7,465,283	19,872,608	4,375,552
26	North Carolina	15	9,500	1,677,730	524,052	46,857	200,200	277,595	1,153,078	84,535
27	Ohio	128	709,875	9,715,266	4,370,238	900,364	1,780,220	1,689,654	5,345,028	1,113,470
28	Oregon	4	120,000	161,250	18,000	.....	.....	18,000	143,250	62,600
29	Pennsylvania	248	1,180,700	31,741,167	15,703,184	3,947,060	4,709,182	7,046,942	16,037,983	3,788,158
30	Rhode Island	16	200,000	561,303	239,111	51,700	79,667	107,744	322,192	57,209
31	South Carolina	21	6,330	5,968,218	2,255,289	469,400	1,065,783	720,106	3,712,929	488,938
32	Tennessee	14	14,125	698,728	312,302	69,600	149,511	93,191	386,426	90,690
33	Texas	10	15,982	84,359	41,865	4,550	26,200	11,115	42,494	22,120
34	Vermont	6	17,000	61,976	24,200	3,800	6,200	14,200	37,776	9,100
35	Virginia	46	158,073	2,317,992	730,900	144,100	356,050	230,750	1,587,092	400,085
36	West Virginia	8	56,775	146,800	85,800	10,200	28,700	46,900	61,000	25,100
37	Wisconsin	17	40,000	564,010	250,844	53,057	96,600	100,587	313,166	93,971
38	All other states (a)	5	12,570	215,604	48,100	8,000	17,600	22,500	167,504	9,572

a Includes states grouped in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Arkansas, 1; Mississippi, 3; Washington, 1.

ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1890.

CAPITAL—continued.		MISCELLANEOUS EXPENSES.								
Direct investment—Continued.										
Live assets—Continued.										
Stock in process and finished products on hand.	Cash, bills and accounts receivable, and sundries not elsewhere reported.	Total.	Rent paid for tenancy.	Taxes.	Insurance.	Repairs, ordinary, of buildings and machinery.	Amount paid to contractors.	Interest paid on cash used in the business.	All sundries not elsewhere reported.	
$27,241,216	$49,281,551	$13,640,343	$941,660	$715,188	$874,606	$1,756,000	$24,700	$1,359,920	$7,967,369	1
38,000	494,975	51,875	950	6,210	4,640	8,575	.....	13,500	18,000	2
785,260	693,142	275,606	34,055	24,655	19,573	34,137	.....	8,958	154,228	3
23,600	54,400	14,880	6,020	520	1,020	4,025	.....	45	2,050	4
847,245	1,204,012	457,964	7,414	10,075	9,458	32,170	.....	15,807	383,040	5
724,350	961,964	71,270	2,695	7,441	9,982	28,430	.....	4,887	17,835	6
12,761	35,660	9,330	3,801	141	488	2,750	.....	600	1,550	7
180	1,900	1,059	660	4	105	10	.....	80	200	8
304,373	3,244,239	480,525	7,200	22,710	43,923	46,097	.....	142,781	226,814	9
1,610,477	2,222,214	763,990	90,156	38,104	54,636	53,849	.....	53,344	473,901	10
112,373	110,274	95,700	4,175	4,408	4,355	5,865	.....	5,708	71,189	11
8,800	4,300	2,581	920	588	913	100	.....	60	.....	12
26,000	23,500	19,749	.....	886	420	1,675	.....	1,000	15,768	13
166,084	165,985	57,619	4,140	2,918	4,904	6,372	.....	7,250	32,035	14
60,000	358,000	28,501	1,700	277	6,043	12,818	.....	4,195	3,468	15
73,550	180,188	39,172	3,181	3,757	4,054	12,586	.....	1,230	14,364	16
1,332,738	4,191,819	572,349	48,091	51,324	53,424	73,776	.....	64,152	281,582	17
1,182,856	3,114,186	722,770	59,576	41,698	56,971	85,021	.....	39,210	439,394	18
1,242,502	1,241,399	682,497	13,478	33,880	26,703	55,336	.....	51,724	501,376	19
40,593	199,081	45,752	12,600	661	2,289	1,423	.....	3,100	25,679	20
1,204,613	1,587,211	436,952	27,990	29,512	45,064	54,764	.....	36,544	243,078	21
33,586	148,446	45,967	2,800	973	1,844	1,345	.....	7,067	31,938	22
11,000	13,092	22,550	800	950	.....	3,500	.....	800	16,500	23
3,343,440	4,526,973	1,275,836	94,594	73,544	92,487	234,558	.....	116,860	663,793	24
6,022,125	9,474,931	3,909,117	317,999	196,036	183,438	459,502	19,500	346,080	2,386,562	25
67,288	1,001,255	105,407	800	9,937	7,799	15,103	.....	16,542	55,226	26
1,810,476	2,421,082	884,501	57,090	46,801	41,975	109,764	.....	54,059	574,812	27
30,150	50,500	18,495	10,800	900	2,575	1,100	.....	2,140	980	28
5,193,748	7,056,077	1,712,033	86,191	62,455	120,612	263,176	5,200	103,356	1,011,043	29
65,359	199,624	62,509	14,600	3,905	4,517	13,037	.....	600	25,850	30
426,173	2,797,818	497,535	500	17,356	45,640	98,495	.....	160,157	175,387	31
58,005	237,731	73,325	1,050	3,134	3,650	9,378	.....	12,423	43,690	32
12,074	8,300	5,911	2,254	312	745	25	.....	.....	2,575	33
13,026	15,050	5,829	1,190	185	594	600	.....	330	2,930	34
259,930	927,077	122,542	13,300	14,547	13,824	19,821	.....	19,128	41,922	35
5,100	30,800	18,583	4,500	681	1,430	1,850	.....	3,712	6,410	36
84,381	134,814	30,077	3,190	3,703	1,977	4,512	.....	1,645	15,050	37
9,000	148,932	10,985	1,200	.....	1,934	455	.....	846	6,550	38

TABLE 2.—DETAILED STATEMENT, CHEMICALS AND ALLIED

	STATES AND TERRITORIES.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.							
		Aggregates.		Officers, firm members, and clerks.		Operatives, skilled and unskilled.		Pieceworkers.	
		Average number.	Total wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
1	The United States	43,701	$25,321,077	5,953	$7,464,260	36,028	$17,193,327	1,720	$663,490
2	Alabama	350	101,358	26	21,555	318	79,403	6	400
3	California	832	603,465	67	118,338	760	475,427	5	9,700
4	Colorado	64	48,141	15	13,370	49	34,771	.....	.....
5	Connecticut	865	503,131	83	84,736	773	409,777	9	8,618
6	Delaware	588	265,664	37	30,935	549	234,654	2	75
7	District of Columbia	45	18,966	4	2,584	35	15,448	6	1,134
8	Florida	28	9,905	5	5,600	23	4,305	.....	.....
9	Georgia	1,528	527,325	175	170,782	1,353	356,543	.....	.....
10	Illinois	1,815	1,311,991	429	533,075	1,375	774,581	11	4,335
11	Indiana	246	152,825	47	60,608	197	91,545	2	672
12	Iowa	35	17,820	5	2,500	30	15,320	.....	.....
13	Kansas	57	32,539	3	3,380	54	29,159	.....	.....
14	Kentucky	236	114,593	48	43,580	161	67,058	27	3,955
15	Louisiana	158	83,605	18	32,927	140	50,678	.....	.....
16	Maine	202	91,463	30	19,480	169	71,807	3	170
17	Maryland	1,965	1,044,516	296	326,586	1,661	715,740	8	2,190
18	Massachusetts	1,984	1,235,319	273	340,929	1,676	876,425	35	17,965
19	Michigan	2,159	1,064,359	343	345,495	1,505	596,114	311	122,750
20	Minnesota	168	85,667	22	21,750	146	63,917	.....	.....
21	Missouri	1,320	845,281	204	281,890	1,106	562,991	10	400
22	Nebraska	99	66,057	22	29,340	77	36,717	.....	.....
23	Nevada	185	67,065	3	6,800	82	47,763	100	12,502
24	New Jersey	4,021	2,936,376	562	821,367	4,036	2,108,439	23	6,570
25	New York	10,593	6,682,971	1,374	2,030,699	8,563	4,407,569	656	244,703
26	North Carolina	428	141,730	42	37,177	386	104,553	.....	.....
27	Ohio	2,263	1,465,012	449	542,767	1,731	884,678	83	37,567
28	Oregon	55	54,270	17	29,650	38	24,620	.....	.....
29	Pennsylvania	7,595	4,380,165	984	1,107,375	6,233	3,097,351	378	175,439
30	Rhode Island	208	145,151	59	62,596	148	80,555	1	2,000
31	South Carolina	1,217	514,055	98	117,290	1,115	396,665	4	100
32	Tennessee	182	85,403	27	30,560	147	51,934	8	2,909
33	Texas	66	45,477	18	18,490	48	26,987	.....	.....
34	Vermont	42	12,743	8	3,412	32	9,070	2	261
35	Virginia	1,140	412,186	118	126,506	997	278,480	25	7,200
36	West Virginia	132	45,555	11	8,580	117	35,175	4	1,800
37	Wisconsin	156	82,180	20	24,245	135	57,860	1	75
38	All other states	74	26,748	11	7,500	63	19,248	.....	.....

PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

COST OF MATERIALS USED.						PRODUCTS.			
Total.	Principal materials.	Fuel.	Rent of power and heat.	Mill supplies.	All other materials.	Aggregate value.	Alum.		Coal tar products.	
							Pounds.	Value.	Value.	
$100,521,080	$98,917,854	$2,070,200	$12,818	$540,701	$4,344,317	$177,811,833	93,998,008	$1,016,710	$687,591	1
665,618	583,713	10,035	.....	900	11,000	940,300	.....	.....	.....	2
2,682,848	2,453,938	101,170	2,120	15,945	40,675	5,312,313	.....	.....	.....	3
401,518	390,210	2,028	.....	1,830	6,550	539,010	.....	.....	.....	4
2,471,501	2,285,650	58,115	.....	24,316	103,420	3,077,301	.....	.....	.....	5
1,565,081	1,428,378	30,981	.....	22,539	83,783	2,403,071	.....	.....	.....	6
92,350	87,810	3,315	800	125	300	135,100	.....	.....	20,000	7
74,075	74,025	50	.....	.....	.....	86,137	.....	.....	.....	8
3,184,670	3,001,529	55,751	.....	5,646	58,744	5,209,784	.....	.....	20,000	9
4,196,842	4,702,445	80,087	6,510	9,174	307,726	8,870,301	.....	.....	.....	10
572,141	558,570	7,668	100	500	5,204	992,586	.....	.....	.....	11
35,240	33,825	1,074	.....	.....	350	66,300	.....	.....	.....	12
65,080	49,499	3,257	.....	373	11,951	163,188	.....	.....	.....	13
471,501	441,354	6,380	.....	2,070	21,778	773,807	.....	.....	.....	14
400,941	378,974	5,849	.....	100	25,018	451,078	.....	.....	.....	15
341,868	302,072	10,388	100	5,306	27,312	535,267	.....	.....	.....	16
5,100,529	4,856,449	111,070	1,180	14,175	117,655	8,243,413	.....	.....	.....	17
5,295,696	4,883,104	148,415	4,217	26,002	203,958	8,079,630	2,340,000	35,000	3,087	18
3,408,098	3,261,531	30,122	1,325	2,405	601,052	6,600,191	.....	.....	.....	19
413,103	390,002	2,010	3,800	175	17,200	731,099	.....	.....	.....	20
4,182,858	3,933,048	80,850	200	26,951	141,603	6,813,484	.....	.....	.....	21
369,917	305,997	10,174	.....	.....	53,746	533,315	.....	.....	.....	22
75,840	56,960	16,180	.....	200	2,500	208,300	.....	.....	.....	23
11,868,432	10,846,945	377,603	550	63,024	580,250	19,826,774	7,191,200	134,408	330,200	24
26,083,638	25,476,055	605,567	16,016	100,150	718,844	44,355,944	12,454,000	231,050	138,324	25
686,281	650,577	13,584	.....	2,600	13,520	1,079,402	.....	.....	.....	26
6,000,602	5,527,100	123,097	1,470	13,124	305,721	10,053,685	.....	.....	.....	27
264,100	238,400	400	.....	.....	25,300	430,000	.....	.....	.....	28
17,303,351	16,052,201	166,631	2,550	112,775	969,191	28,724,441	72,012,808	1,216,102	168,180	29
531,206	500,170	20,388	380	9,605	504	856,705	.....	.....	.....	30
2,783,157	2,562,550	97,056	.....	43,070	70,575	4,527,158	.....	.....	.....	31
280,546	252,707	10,200	.....	936	5,709	531,194	.....	.....	7,800	32
122,876	122,270	531	.....	.....	75	199,900	.....	.....	.....	33
23,777	8,317	420	100	350	13,500	49,098	.....	.....	.....	34
2,083,304	2,026,508	26,715	250	3,740	26,030	3,108,800	.....	.....	.....	35
110,533	103,663	4,515	.....	455	1,900	254,720	.....	.....	.....	36
297,399	238,354	9,872	100	370	48,703	530,637	.....	.....	.....	37
307,295	300,450	1,770	.....	45	5,000	392,000	.....	.....	.....	38

TABLE 2.—DETAILED STATEMENT, CHEMICALS AND ALLIED

	STATES AND TERRITORIES.	PRODUCTS—continued.							
		Dyeing and tanning extracts.					Explosives.		
		Total value.	Extracts.		Chipped wood and other products of this group.		Total value.	Gunpowder.	
			Pounds.	Value.	Pounds.	Value.		Pounds.	Value.
1	The United States	$8,857,084	68,537,940	$7,081,806	119,368,971	$1,775,278	$10,993,131	95,019,174	$6,740,099
2	Alabama	150,000	1,750,000	150,000			33,600		
3	California						2,504,870	3,375,000	315,000
4	Colorado								
5	Connecticut	1,883,600	480,000	1,848,000	1,530,000	35,600	867,832	8,354,640	867,832
6	Delaware						1,077,033	10,256,960	1,077,033
7	District of Columbia								
8	Florida								
9	Georgia								
10	Illinois						6,500		
11	Indiana								
12	Iowa								
13	Kansas						90,898	1,817,955	90,898
14	Kentucky								
15	Louisiana								
16	Maine	99,000	432,000	99,000			164,598	2,370,869	164,598
17	Maryland	75,763	533,000	75,763					
18	Massachusetts	1,987,256	23,323,494	1,675,214	17,309,851	312,042	240,000	1,500,000	240,000
19	Michigan						426,500		
20	Minnesota								
21	Missouri						25,500		
22	Nebraska								
23	Nevada								
24	New Jersey	567,184	1,200,000	303,000	16,159,200	264,184	1,326,252	6,389,000	405,352
25	New York	1,779,388	7,918,047	1,569,847	10,530,020	209,541	771,294	6,849,500	603,794
26	North Carolina								
27	Ohio						1,749,093	21,175,575	1,447,970
28	Oregon								
29	Pennsylvania	1,455,732	26,701,399	1,100,982	22,008,000	354,750	1,458,315	28,696,000	1,312,221
30	Rhode Island	230,000	1,200,000	60,000	7,320,000	170,000			
31	South Carolina								
32	Tennessee	2,800			150,000	2,800	142,111	2,000,000	100,666
33	Texas								
34	Vermont								
35	Virginia	512,843	5,000,000	200,000	33,188,000	312,843			
36	West Virginia	113,518			11,173,900	113,518			
37	Wisconsin						108,735	2,233,675	108,735
38	All other states								

PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

PRODUCTS—continued.										
Explosives—Continued.		Fertilizers.								
High explosives.		Total.		From mineral phosphates.		From raw bone.		All other.		
Pounds.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
30,626,738	$4,253,032	1,898,806	$35,519,841	1,276,708	$23,122,448	274,759	$6,620,925	347,339	$5,776,468	1
240,000	38,600	29,150	666,500	20,100	455,500	.....	.....	9,050	211,000	2
14,411,175	2,189,870	6,100	175,500	.....	.....	3,500	112,500	2,600	63,000	3
.....	.....	50	1,000	.....	.....	50	1,000	.....	.....	4
.....	.....	12,690	267,450	2,050	41,850	280	9,100	10,360	216,500	5
.....	.....	48,241	1,018,170	44,679	936,585	2,042	52,585	1,520	29,000	6
.....	.....	4,640	93,300	1,100	21,000	2,040	53,300	1,500	19,000	7
.....	.....	3,135	86,137	2,970	80,737	90	3,240	75	2,160	8
.....	.....	230,207	4,553,709	200,918	3,981,109	.....	.....	29,289	572,600	9
46,428	6,500	33,819	957,718	.....	.....	33,260	941,878	559	15,840	10
.....	.....	7,366	216,812	.....	.....	7,291	215,312	75	1,500	11
.....	.....	100	2,000	.....	.....	100	2,000	.....	.....	12
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13
.....	.....	10,268	255,116	9,090	219,060	1,160	33,670	18	2,386	14
.....	.....	11,773	263,678	1,173	28,678	4,600	115,000	6,000	120,000	15
.....	.....	3,998	63,570	375	11,250	323	9,920	3,300	42,400	16
.....	.....	366,422	6,042,442	298,676	4,978,079	20,672	473,990	47,074	590,373	17
.....	.....	91,502	1,922,113	80,350	1,672,100	2,417	70,235	8,735	179,778	18
2,301,044	426,500	18,715	301,025	.....	.....	15,015	285,375	3,700	15,650	19
.....	.....	1,700	86,000	1,700	86,000	.....	.....	.....	.....	20
150,000	25,500	11,496	207,806	.....	.....	6,958	162,926	4,538	44,880	21
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23
8,264,725	920,900	169,193	3,973,112	59,071	1,488,988	64,626	1,463,985	45,496	1,020,139	24
1,142,000	167,500	177,982	3,108,467	129,859	2,135,405	23,935	630,640	24,188	402,422	25
.....	.....	54,424	938,755	50,555	860,295	88	3,140	3,781	75,320	26
2,736,071	301,123	53,062	1,163,784	2,515	53,100	36,115	784,050	14,432	326,634	27
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28
1,125,895	146,094	73,946	1,603,431	17,958	311,394	38,294	833,004	17,694	459,033	29
.....	.....	4,000	99,000	3,000	75,000	1,000	24,000	.....	.....	30
.....	.....	293,806	4,379,033	254,869	3,759,450	2,500	60,000	36,437	559,583	31
208,500	35,445	8,200	221,400	4,000	130,000	1,650	41,500	2,550	49,900	32
.....	.....	33	925	.....	.....	33	925	.....	.....	33
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34
.....	.....	154,497	2,407,738	79,595	1,523,793	5,820	222,650	69,082	661,295	35
.....	.....	2,200	47,500	1,300	32,500	900	15,000	.....	.....	36
.....	.....	286	10,000	.....	.....	.....	.....	286	10,000	37
.....	.....	15,805	326,650	10,805	240,575	.....	.....	5,000	86,075	38

TABLE 2.—DETAILED STATEMENT, CHEMICALS AND ALLIED

	STATES AND TERRITORIES.	PRODUCTS—continued.								
		Paints, colors, and varnishes.								
			Pigments.							
		Total value.	White lead.		Oxide of lead.		Barytes. (Ground or floated.)		Oxide of zinc.	
			Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1	The United States	$52,908,252	a143,620,471	$3,297,627	b24,662,007	$1,238,577	43,143,000	$377,039	17,648,000	$695,920
2	Alabama									
3	California	1,148,151	a7,000,000		119,043	9,523				
4	Colorado	489,620								
5	Connecticut	719,169					8,400,000	67,000		
6	Delaware	31,600								
7	District of Columbia									
8	Florida									
9	Georgia	62,000								
10	Illinois	6,071,502	a14,827,424	404,633	2,000,000	98,375	200,000	12,000	400,000	16,000
11	Indiana	438,476								
12	Iowa	58,300								
13	Kansas	37,200								
14	Kentucky	346,759	a1,381,522	4,183						
15	Louisiana	126,000								
16	Maine	45,495								
17	Maryland	411,223	1,580,000	82,458						
18	Massachusetts	1,802,181								
19	Michigan	2,039,718								
20	Minnesota	478,049								
21	Missouri	3,413,047	a29,003,259		b1,868,087	68,768	19,972,000	209,000	2,400,000	101,000
22	Nebraska	533,315	a6,585,000							
23	Nevada									
24	New Jersey	4,499,096			350,000	22,000			7,348,000	293,920
25	New York	14,745,261	31,755,390	1,540,396	7,691,486	355,753	600,000	6,000		
26	North Carolina	31,600					4,800,000	31,600		
27	Ohio	5,534,968	a19,271,791		1,249,000	62,816			500,000	22,500
28	Oregon	275,000								
29	Pennsylvania	8,848,995	a32,216,085	1,265,957	11,384,391	621,342	291,000	1,455	7,000,000	262,500
30	Rhode Island	158,417								
31	South Carolina	16,000								
32	Tennessee	72,583								
33	Texas	75,975								
34	Vermont	21,698								
35	Virginia	73,319					8,820,000	50,884		
36	West Virginia	5,000								
37	Wisconsin	241,495								
38	All other states	65,950								

a Includes an intermediate product of 80,603,330 pounds for which no value is reported, distributed as follows: California, 7,000,000 pounds; Illinois, 7,170,997 pounds; Kentucky, 1,305,460 pounds; Missouri, 29,003,259 pounds; Nebraska, 6,585,000 pounds; Ohio, 19,271,791 pounds; Pennsylvania, 10,266,823 pounds.

PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

PRODUCTS—continued.										
Paints, colors, and varnishes—Continued.										
Pigments—Continued.								Paints, varnishes, and japans.		
Lampblack and hydrocarbon blacks.		Fine colors.		Iron oxide and other earth colors.		Pulp colors. (Sold moist.)		Paints in oil, in paste.		
Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
11,617,396	$608,800	27,215,687	$3,481,349	138,372,483	$1,068,800	10,440,763	$507,918	211,545,504	$13,448,569	1
										2
								9,254,031	758,316	3
				1,002,000	12,120					4
460,000	20,000			7,220,910	61,010			387,205	27,017	5
				120,000	3,000			322,857	22,600	6
										7
										8
				700,000	7,000			150,000	9,000	9
10,000	5,000	781,450	154,057	2,310,000	24,000		400	24,508,597	1,728,579	10
								280,000	20,000	11
				812,500	6,500			208,333	12,500	12
										13
		5,200	3,350	600,000	3,600			2,458,175	105,626	14
								760,000	51,000	15
								342,000	28,500	16
2,000	200	160,000	17,200	4,026,000	24,570	30,000	3,000	1,118,992	76,276	17
973,058	49,383	1,320,260	241,386	3,291,792	32,000	301,500	32,200	5,145,115	298,686	18
		180,000	45,400	78,000	1,170			2,550,000	170,000	19
								111,000	9,000	20
30,000	1,500	80,000	6,000	12,560,000	79,000			39,280,856	2,231,603	21
200	50	1,200	2,400					7,286,000	411,797	22
										23
180,000	9,000	8,302,564	614,547	6,000,000	55,000	1,050,000	61,700	5,000,000	257,041	24
304,238	26,436	13,933,319	2,098,989	8,344,500	144,208	3,068,390	269,998	31,438,730	1,969,135	25
										26
		365,625	43,875	10,916,580	81,040			32,615,012	2,115,874	27
								300,000	30,000	28
9,597,900	492,231	2,086,069	254,145	54,954,712	407,267	5,390,873	140,620	43,582,028	2,875,348	29
								732,500	51,900	30
										31
				16,304,000	71,183					32
								166,520	24,826	33
				4,201,480	10,898					34
				750,000	5,475					35
60,000	5,000									36
				4,120,000	33,750			2,140,917	138,045	37
								416,666	25,000	38

b Includes an intermediate product of 312,252 pounds reported for Missouri, for which no value is given.

TABLE 2.—DETAILED STATEMENT, CHEMICALS AND ALLIED

	STATES AND TERRITORIES.	PRODUCTS—continued.							
		Paints, colors, and varnishes—Continued.					Pharmaceutical preparations.	Potash and pearlash.	
		Paints, varnishes, and japans—Continued.				Value of all other products of this group.			
		Paints, ready mixed for use.		Varnishes and japans.					
		Gallons.	Value.	Gallons.	Value.		Value.	Pounds.	Value.
1	The United States	12,716,101	$12,047,315	14,539,202	$13,987,268	$2,148,170	$16,744,643	5,106,939	$197,507
2	Alabama								
3	California	276,440	193,882	141,810	141,110	45,320	99,612		
4	Colorado	475,200	472,500			5,000			
5	Connecticut	13,260	18,483	215,754	883,150	142,509	33,775		
6	Delaware	7,000	6,000				10,000		
7	District of Columbia								
8	Florida								
9	Georgia	48,000	36,000	12,500	10,000		50,000		
10	Illinois	2,243,029	2,067,006	1,672,700	1,345,857	215,595	661,101		
11	Indiana	154,934	112,175	214,956	299,401	6,000	305,000	71,375	2,855
12	Iowa	31,300	39,300				6,000		
13	Kansas	40,000	37,200				35,000		
14	Kentucky	205,000	140,000	150,000	90,000		111,410		
15	Louisiana	50,000	50,000			25,000	35,000		
16	Maine	15,720	15,720			1,275	47,000	211,030	8,323
17	Maryland	139,864	144,829	46,952	58,090	4,000	911,550		
18	Massachusetts	509,330	474,663	513,034	571,392	102,471	949,000		
19	Michigan	601,472	657,769	1,783,000	1,065,000	100,379	3,035,999	2,995,259	107,469
20	Minnesota	531,499	442,499			26,550	97,050		
21	Missouri	631,400	499,120	371,309	191,606	25,450	1,115,144		
22	Nebraska	77,673	77,673			41,395			
23	Nevada								
24	New Jersey	765,784	711,093	1,823,222	2,439,795	26,000	1,839,600		
25	New York	2,312,045	2,268,863	5,107,670	5,230,718	834,765	4,031,147	627,525	23,328
26	North Carolina								
27	Ohio	2,069,350	2,082,532	1,361,840	1,006,122	120,200	585,250	1,201,750	55,532
28	Oregon	160,000	150,000			95,000	150,000		
29	Pennsylvania	1,181,121	1,122,042	1,066,555	1,098,427	307,661	2,373,848		
30	Rhode Island	65,356	64,517	16,000	20,000	22,000	4,000		
31	South Carolina	20,000	16,000						
32	Tennessee	2,000	1,000			400	25,000		
33	Texas	57,724	51,149				123,000		
34	Vermont	4,000	4,800				28,000		
35	Virginia	14,200	11,960	10,000	5,000		46,000		
36	West Virginia								
37	Wisconsin	58,000	62,500	6,900	6,000	1,200	36,157		
38	All other states	14,500	15,950	25,000	25,000				

PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

PRODUCTS—continued.									
	Sodas.								
Total value.	Soda ash.		Sal soda.		Bicarbonate of soda.		Caustic soda.		
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
$5,432,400	94,801,200	$1,179,720	144,641,705	$1,581,706	60,678,750	$2,009,800	33,002,720	$661,114	1
									2
122,195	1,000,000	10,000	8,407,600	98,195	1,278,750	14,000			3
									4
									5
									6
									7
									8
									9
179,500			14,623,392	179,500					10
5,000			400,000	5,000					11
									12
									13
									14
									15
									16
36,659			3,739,982	36,659					17
4,405			552,400	4,405					18
									19
									20
									21
									22
									23
2,688			278,640	2,688					24
4,400,041	92,000,000	1,150,000	91,908,952	1,017,627	51,400,000	1,800,800	22,802,720	431,614	25
									26
71,390			7,921,110	71,390					27
									28
610,522	1,801,200	19,720	16,809,629	166,302	8,000,000	195,000	10,200,000	229,500	29
									30
									31
									32
									33
									34
									35
									36
									37
									38

TABLE 2.—DETAILED STATEMENT, CHEMICALS AND ALLIED

	STATES AND TERRITORIES.	PRODUCTS—continued.						
		Sulphuric acid.						
		Total value.	50° baumé.		60° baumé.		66° baumé.	
			Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1	The United States	$5,198,978	a1,009,863,407	$1,826,572	20,379,908	$122,940	354,533,657	$3,249,466
2	Alabama	20,000	4,000,000	20,000				
3	California	244,567					21,199,833	244,567
4	Colorado	30,000					1,200,000	30,000
5	Connecticut	61,500					11,000,000	61,500
6	Delaware							
7	District of Columbia							
8	Florida							
9	Georgia	126,230	a144,846,400	100,270			2,096,000	25,960
10	Illinois	170,400	20,450,000	68,000			10,240,000	102,400
11	Indiana							
12	Iowa							
13	Kansas							
14	Kentucky							
15	Louisiana							
16	Maine	18,688	813,586	4,878	1,301,311	10,400	248,752	3,410
17	Maryland	372,400	a185,628,400	372,400				
18	Massachusetts	82,951	a57,118,300	4,740	2,728,100	11,711	7,101,600	66,500
19	Michigan		a7,275,600					
20	Minnesota							
21	Missouri	49,600					4,200,000	49,600
22	Nebraska							
23	Nevada	32,000	1,600,000	32,000				
24	New Jersey	1,305,181	a72,770,740	335,225	2,297,096	17,262	120,396,170	952,694
25	New York	878,303	35,786,000	143,787	11,812,000	68,647	58,229,459	665,869
26	North Carolina	50,600	a28,192,200	50,600				
27	Ohio	483,440	a15,000,000				64,528,862	483,440
28	Oregon							
29	Pennsylvania	1,008,775	171,698,781	593,748	2,241,401	14,920	37,750,981	400,107
30	Rhode Island	114,378	2,100,000	12,159			10,502,000	102,219
31	South Carolina	21,765	a218,463,400	21,765				
32	Tennessee	35,000	7,000,000	35,000				
33	Texas							
34	Vermont							
35	Virginia	32,000	a37,120,000	32,000				
36	West Virginia	30,000					3,240,000	30,000
37	Wisconsin	31,200					2,600,000	31,200
38	All other states							

a Includes an intermediate product of 581,536,200 pounds, for which no value is reported, distributed as follows: Georgia, 96,138,400 pounds; Maryland, 155,900,800 pounds; Massachusetts, 55,900,000 pounds; Michigan, 7,275,600 pounds; New Jersey, 5,000,000 pounds; North Carolina, 6,192,000 pounds; Ohio, 15,000,000 pounds; South Carolina, 211,009,400 pounds; Virginia, 29,120,000 pounds.

PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

PRODUCTS—continued.									
Wood alcohol and acetate of lime.							Value of chemicals, including all acids, bases, and salts, organic or inorganic, not heretofore enumerated.	All other products.	
Total value.	Wood alcohol. (Crude.)		Wood alcohol. (Refined.)		Acetate of lime.				
	Gallons.	Value.	Gallons.	Value.	Pounds.	Value.		Value.	
$1,885,469	949,733	$613,607	917,605	$956,432	26,778,415	$315,430	$24,751,974	$13,018,253	1
								79,200	2
							818,483	198,935	3
							19,290		4
								143 975	5
							66,000	200,268	6
							21,800		7
									8
							440	397,405	9
							434,264	395,406	10
							23,443	1,000	11
									12
									13
							21,589	38,993	14
							5,000	22,000	15
							68,592	20,001	16
							77,984	315,392	17
1,600			2,000	1,600			1,495,750	156,287	18
119,186	89,806	48,733	59,008	50,150	3,135,652	20,303	116,061	454,233	19
								70,000	20
							1,523,763	478,624	21
									22
							140,700	35,000	23
50,750			50,450	50,750			4,542,685	1,264,558	24
1,215,475	405,580	267,022	755,647	801,642	11,857,857	146,811	7,172,449	5,801,417	25
1,492	2,131	1,492					18,955	38,090	26
							796,527	213,701	27
							5,000		28
475,766	426,216	283,360	44,250	44,790	11,772,906	147,616	7,216,627	2,288,058	29
							77,270	173,700	30
2,500			1,250	2,500				107,860	31
13,000	26,000	13,000						11,500	32
									33
									34
								36,900	35
							58,702		36
5,700			5,000	5,000	12,000	700	30,600	75,150	37
									38

TABLE 3.—CLASSIFICATION OF EMPLOYÉS AND WAGES, CHEMICALS

	STATES AND TERRITORIES.	AGGREGATES.			AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS.							
					Officers and firm members actively engaged in the industry or in supervision.							
					Males above 16 years.				Females above 15 years.			
		Number of establishments reporting.	Average number.	Total wages.	Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.
1	The United States	1,626	43,701	$25,321,077	2,254	47	$35.28	$3,719,009	8	44	$19.59	$6,962
2	Alabama	11	350	101,958	19	31	30.24	17,560				
3	California	36	832	603,465	32	48	46.87	71,497				
4	Colorado	6	64	48,141	9	33	26.92	8,050				
5	Connecticut	28	865	503,131	20	40	33.12	38,494	1	50	16.05	800
6	Delaware	23	588	265,664	21	35	22.92	16,835				
7	District of Columbia	5	45	18,966								
8	Florida	3	28	9,905	4	39	32.05	5,000				
9	Georgia	49	1,528	527,325	98	34	30.30	100,765				
10	Illinois	86	1,815	1,311,991	131	51	38.59	258,343				
11	Indiana	19	246	152,825	27	43	32.42	37,508				
12	Iowa	5	35	17,820	4	33	14.62	1,900				
13	Kansas	3	57	32,539	3	52	21.67	3,380				
14	Kentucky	16	236	114,593	26	47	24.12	29,339				
15	Louisiana	6	158	83,605	12	42	54.40	27,167				
16	Maine	23	202	91,463	24	40	16.87	16,306				
17	Maryland	89	1,965	1,044,516	130	45	29.31	173,143				
18	Massachusetts	112	1,984	1,235,319	141	49	30.73	210,644				
19	Michigan	83	2,159	1,064,359	83	47	27.03	104,405				
20	Minnesota	9	168	85,667	13	52	23.15	15,500				
21	Missouri	54	1,320	845,281	90	48	38.78	169,020	2	52	18.27	1,900
22	Nebraska	4	99	66,057	8	30	54.39	13,200				
23	Nevada	4	185	97,065	3	48	47.55	6,800				
24	New Jersey	124	4,621	2,936,376	201	49	46.08	452,747				
25	New York	290	10,593	6,682,971	417	50	41.30	853,447	2	48	31.47	3,000
26	North Carolina	15	428	141,730	23	37	25.93	21,911	2	27	10.01	542
27	Ohio	128	2,263	1,465,012	206	48	32.43	321,722				
28	Oregon	4	55	54,270	10	52	45.58	23,700				
29	Pennsylvania	248	7,595	4,389,165	315	48	31.54	481,283	1	52	13.85	720
30	Rhode Island	16	208	145,151	20	50	27.90	28,078				
31	South Carolina	21	1,217	514,055	37	44	39.41	63,785				
32	Tennessee	14	182	85,403	17	41	31.57	22,160				
33	Texas	10	66	45,477	11	46	24.34	12,290				
34	Vermont	6	42	12,743	8	41	10.36	3,412				
35	Virginia	46	1,140	412,186	55	45	31.82	78,728				
36	West Virginia	8	132	45,555	8	45	21.33	7,740				
37	Wisconsin	17	156	82,189	10	39	41.41	16,150				
38	All others states (*a*)	5	74	26,748	9	38	20.64	7,000				

a Includes states grouped in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Arkansas, 1; Mississippi, 3; Washington, 1.

AND ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1890.

AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS—continued.

Clerks.								Operatives and skilled.								
Males above 16 years.				Females above 15 years.				Males above 16 years.				Females above 15 years.				
Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	
3,430	50	$21.11	$3,607,556	261	43	$11.54	$130,733	18,573	48	$11.37	$10,201,314	1,897	51	$5.69	$550,683	1
7	25	22.49	3,995					175	29	9.10	46,535					2
32	49	28.84	45,617	3	52	7.85	1,224	365	49	14.81	267,306	9	49	7.70	3,403	3
6	52	17.05	5,320					32	46	16.45	24,100	1	52	6.00	312	4
53	48	17.84	45,442					681	44	12.33	368,527	2	33	9.00	585	5
15	48	19.00	13,750	1	52	6.73	350	355	49	9.75	168,330					6
4	44	13.42	2,384					31	34	12.85	13,584					7
1	26	23.08	600					2	24	16.36	780					8
77	42	21.59	70,017					581	32	8.63	161,578	12	50	4.47	2,672	9
280	51	18.53	265,125	18	51	10.53	9,607	584	51	13.50	401,577	64	50	6.05	19,320	10
20	52	22.21	23,100					108	46	10.84	54,217	56	52	6.66	19,408	11
1	52	11.54	600					29	52	9.92	14.956					12
								42	42	14.22	25,135	5	52	2.00	520	13
18	44	15.58	12,341	4	48	9.85	1,900	110	47	9.17	47,781	6	52	3.37	1,050	14
6	43	22.34	5,760					68	34	10.14	23,144	5	52	3.96	1,030	15
6	47	11.33	3,180					140	43	10.46	63,496	3	46	3.43	468	16
154	48	20.14	149,893	12	49	6.02	3,550	1,158	49	9.91	558,242	183	52	4.27	40,605	17
112	51	21.53	122,941	20	51	7.21	7,344	959	50	11.51	546,808	79	50	5.79	22,689	18
217	52	19.31	217,254	43	52	10.66	23,836	868	51	8.52	375,905	262	51	5.95	79,748	19
8	51	14.04	5,750	1	52	9.62	500	51	51	15.31	40,016	10	51	4.67	2,396	20
97	50	21.28	102,615	15	50	11.13	8,355	390	48	13.10	245,946	49	52	6.03	15,224	21
13	49	24.69	15,620	1	52	10.00	520	54	38	14.37	29,204	1	52	7.02	365	22
								51	51	13.59	35,278					23
346	49	21.03	358,876	15	50	12.92	9,744	2,022	51	12.05	1,236,769	179	51	5.95	53,764	24
887	50	25.52	1,138,425	68	51	10.32	35,827	4,711	51	11.38	2,719,810	450	51	6.56	140,585	25
17	40	21.47	14,724					180	31	8.10	44,945					26
226	50	19.05	213,506	17	46	9.72	7,539	905	49	12.30	542,572	75	51	5.34	20,558	27
7	52	16.35	5,950					18	52	17.63	16,500	5	52	8.08	2,100	28
632	51	18.79	607,418	36	52	9.59	17,954	2,968	50	11.66	1,730,876	418	51	5.14	110,656	29
37	51	17.81	33,750	2	51	7.54	768	45	51	12.93	29,777					30
60	46	19.30	53,025	1	52	9.23	480	173	45	13.65	106,212					31
9	50	17.31	7,800	1	52	11.54	600	84	40	9.81	32,977	3	52	3.21	500	32
7	52	17.03	6,200					40	44	13.84	24,619					33
								12	40	8.44	4,095	1	52	4.33	225	34
61	46	17.00	47,178	2	46	6.59	600	388	41	7.66	122,245	4	52	4.81	1,000	35
3	45	6.25	840					99	44	7.05	30,488					36
9	45	20.00	8,060	1	5	6.46	35	66	45	11.44	34,064	15	48	3.50	2,500	37
2	26	9.62	500					28	28	16.43	12,920					38

TABLE 3.—CLASSIFICATION OF EMPLOYÉS AND WAGES, CHEMICALS AND

AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS—continued.

	STATES AND TERRITORIES.	Operatives and skilled—Continued.				Unskilled.					
		Children.				Males above 16 years.				Females above 15 years.	
		Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	Number.	Average number of weeks employed.
1	The United States	91	48	$3.62	$15,716	14,271	48	$8.90	$6,155,294	997	50
2	Alabama	1	26	3.08	80	142	49	5.78	32,788		
3	California					370	49	11.10	200,610	10	52
4	Colorado					16	47	13.74	10,359		
5	Connecticut					87	47	9.73	39,989	3	52
6	Delaware					194	47	7.25	66,324		
7	District of Columbia					4	41	11.32	1,864		
8	Florida					21	27	6.21	3,525		
9	Georgia	5	30	1.87	284	753	40	6.36	191,709		
10	Illinois	9	48	4.35	1,867	640	51	10.22	334,439	75	52
11	Indiana					33	50	10.77	17,920		
12	Iowa					1	52	7.00	364		
13	Kansas					7	39	12.84	3,504		
14	Kentucky					38	48	9.29	16,965	6	52
15	Louisiana					57	47	9.05	24,164	10	47
16	Maine					26	34	8.80	7,843		
17	Maryland	2	52	1.50	156	254	47	8.81	104,830	64	52
18	Massachusetts					598	51	9.66	294,967	37	52
19	Michigan	11	52	2.26	1,290	302	50	7.92	120,526	61	52
20	Minnesota					33	52	8.15	13,933	10	52
21	Missouri	6	52	4.23	1,320	561	49	10.01	277,137	90	52
22	Nebraska					19	42	8.26	6,514	1	52
23	Nevada					31	40	10.11	12,485		
24	New Jersey	10	52	4.88	2,540	1,683	50	9.43	789,596	136	45
25	New York	23	51	3.91	4,562	2,947	50	9.66	1,433,801	387	51
26	North Carolina					196	41	7.19	57,708		
27	Ohio	10	46	3.13	1,422	702	49	8.96	310,988	28	48
28	Oregon					14	52	7.94	5,780	1	52
29	Pennsylvania	10	52	3.69	1,912	2,729	50	9.00	1,227,080	62	52
30	Rhode Island					101	51	9.83	50,232	2	52
31	South Carolina	1	13	2.69	35	941	48	6.40	290,418		
32	Tennessee					46	45	6.57	13,457	14	52
33	Texas	2	13	2.62	68	6	34	11.29	2,300		
34	Vermont					19	40	6.23	4,750		
35	Virginia					594	41	6.32	154,285		
36	West Virginia	1	46	3.96	180	17	41	6.43	4,507		
37	Wisconsin					54	47	8.32	21,296		
38	All other states					35	28	6.43	6,328		

ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS—continued.						PIECEWORKERS—AVERAGE NUMBER EMPLOYED AND TOTAL WAGES.								
Unskilled—Continued.														
Females above 15 years—continued.		Children.				Summary.		Males above 16 years.		Females above 15 years.		Children.		
Average weekly earnings per employé.	Total wages.	Number.	Average number of weeks employed.	Average weekly earnings per employé.	Total wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	
$4.74	$237,894	199	50	$3.26	$32,426	1,750	$663,490	844	$410,746	820	$245,702	56	$7,042	1
						6	400			6	400			2
5.94	3,064	6	51	3.39	1,044	5	9,700	5	9,700					3
														4
4.33	676					9	8,618	9	8,618					5
						2	75	2	75					6
						6	1,134	6	1,134					7
														8
		2	52	2.88	300									9
4.33	16,898	3	48	3.36	480	11	4,335	3	1,546	8	2,789			10
						2	672	2	672					11
														12
														13
3.70	1,184	1	52	1.50	78	27	3,955	2	830	25	3,125			14
5.02	2,340													15
						3	170	3	170					16
3.58	11,898					8	2,190	8	2,190					17
5.91	11,366	3	52	3.81	595	35	17,965	11	8,818	24	9,147			18
5.87	18,610	1	48	0.73	35	311	122,750	54	32,150	257	90,600			19
2.88	1,500	42	52	2.78	6,072									20
4.58	21,224	10	50	4.27	2,140	10	400			10	400			21
5.00	260	2	52	3.60	374									22
						100	12,502	100	12,502					23
4.07	25,170	6	50	2.01	600	23	6,570	1	150	22	6,420			24
4.75	93,247	45	51	2.84	6,564	656	244,703	226	122,990	414	119,061	16	2,652	25
		10	52	3.65	1,900									26
5.51	7,375	11	44	2.68	1,763	83	37,567	53	30,105	20	5,772	10	1,690	27
4.62	240													28
5.37	17,296	46	48	4.28	9,531	378	175,439	317	165,066	31	7,673	30	2,700	29
5.25	546					1	2,000	1	2,000					30
						4	100	4	100					31
6.87	5,000					8	2,909	6	2,669	2	240			32
														33
						2	261	2	261					34
		11	47	1.83	950	25	7,200	25	7,200					35
						4	1,800	4	1,800					36
						1	75			1	75			37
														38

TABLE 4.—AVERAGE NUMBER OF EMPLOYÉS AT THE DIFFERENT WEEKLY RATES OF PAY, CHEMICALS AND ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1890.

STATES AND TERRITORIES.	Number of establishments reporting.	AVERAGE NUMBER OF HOURS IN ORDINARY DAY OF LABOR.		AGGREGATES.		WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF EMPLOYÉS AT EACH RATE, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK. (a)					
						Males above 16 years.					
		May to November.	November to May.	Average number.	Total wages.	Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.	$7 and over but under $8.	$8 and over but under $9.	$9 and over but under $10.
The United States	1,626	9.94	9.84	43,701	$25,321,077	38,528	1,259	1,592	2,403	2,947	5,196	6,142
Alabama	11	9.25	10.45	350	101,358	343	55	80	123	7	.....	.....
California	36	9.82	9.66	832	603,465	799	48	2	12	32	48	40
Colorado	6	9.83	9.50	64	48,141	63	.....	1	.....	.....	1	1
Connecticut	28	9.82	9.77	865	503,131	850	38	6	25	38	12	144
Delaware	23	10.13	10.00	588	265,664	585	21	43	57	111	100	117
District of Columbia	5	10.60	10.60	45	18,966	39	.....	1	.....	6	2	14
Florida	3	10.00	10.00	26	9,905	28	.....	.....	20	1	1	2
Georgia	49	10.26	10.36	1,528	527,325	1,509	107	402	366	167	24	37
Illinois	86	9.66	9.55	1,815	1,311,991	1,695	15	10	28	40	64	258
Indiana	19	10.00	9.75	246	152,825	188	1	6	14	7	14	31
Iowa	5	10.00	10.00	35	17,820	35	.....	3	.....	1	1	3
Kansas	3	10.00	10.00	57	32,539	52	2	.....	.....	4	.....	8
Kentucky	16	10.09	9.84	236	114,593	192	20	8	8	51	8	19
Louisiana	6	10.00	10.17	158	83,605	143	6	9	9	29	6	35
Maine	23	10.22	10.13	202	91,463	196	8	6	9	22	12	38
Maryland	89	9.78	9.67	1,965	1,044,516	1,696	34	49	125	175	288	362
Massachusetts	112	9.65	9.54	1,984	1,235,319	1,810	74	27	33	194	109	413
Michigan	83	10.11	10.02	2,159	1,064,359	1,470	109	47	107	185	203	297
Minnesota	9	9.72	9.56	168	85,667	105	4	.....	4	2	29	14
Missouri	54	9.93	9.79	1,320	845,281	1,138	16	25	13	23	124	138
Nebraska	4	10.00	9.75	99	66,057	94	.....	.....	9	6	3	9
Nevada	4	9.75	9.75	185	97,065	85	.....	.....	.....	2	10	21
New Jersey	124	9.87	9.70	4,621	2,936,376	4,252	26	128	42	150	374	1,187
New York	290	9.84	9.80	10,593	6,682,971	8,962	168	148	141	363	2,215	1,328
North Carolina	15	10.17	10.10	428	141,730	416	65	29	102	83	29	12
Ohio	128	10.04	9.84	2,263	1,465,012	2,039	18	30	140	96	210	280
Oregon	4	9.75	10.00	55	54,270	40	.....	2	1	1	13	.....
Pennsylvania	248	10.11	9.96	7,595	4,380,165	6,644	96	96	155	616	1,151	1,114
Rhode Island	16	10.25	10.13	208	145,151	203	2	4	3	8	1	67
South Carolina	21	10.05	10.14	1,217	514,055	1,211	94	182	420	197	50	69
Tennessee	14	10.29	10.14	182	85,403	156	2	5	35	31	15	7
Texas	10	9.80	9.80	66	45,477	64	1	5	1	1	.....	3
Vermont	6	10.00	9.50	42	12,743	39	.....	8	5	8	14	2
Virginia	46	10.27	9.99	1,140	412,186	1,098	124	155	356	207	52	23
West Virginia	8	9.63	9.38	132	45,555	127	2	64	17	12	1	13
Wisconsin	17	9.88	9.60	156	82,180	139	3	3	7	21	12	34
All other states (b)	5	10.00	10.00	74	26,748	74	10	8	16	10	.....	2

a In comparing the table of weekly rates and number of employés at each rate with the average weekly earnings, it must be remembered that it is not Practicable to obtain true average weekly earnings from the table of weekly rates, because the term of employment varies for employés reported at the respective rates.

b Includes states grouped in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Arkansas, 1; Mississippi, 3; Washington, 1.

TABLE 4.—AVERAGE NUMBER OF EMPLOYÉS AT THE DIFFERENT WEEKLY RATES OF PAY, CHEMICALS AND ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

STATES AND TERRITORIES.	WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF EMPLOYÉS AT EACH RATE, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK—continued.											
	Males above 16 years—Continued.					Females above 15 years.						
	$10 and over but under $12.	$12 and over but under $15.	$15 and over but under $20.	$20 and over but under $25.	$25 and over.	Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.	$7 and over but under $8.	$8 and over but under $9.	$9 and over but under $10.	$10 and over but under $12.
The United States	6,220	4,690	3,777	1,590	2,712	3,163	1,152	709	629	248	101	113	116
Alabama	.....	18	3	46	11	.....	.....	.....	.....	.....	.....	.....	.....
California	120	231	158	43	65	22	6	2	4	5	1	1	1
Colorado	1	16	30	6	7	1	.....	.....	1	.....	.....	.....	.....
Connecticut	178	197	123	57	32	6	2	1	.....	.....	.....	2	.....
Delaware	73	33	9	6	15	1	.....	.....	1	.....	.....	.....	.....
District of Columbia	5	6	3	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Florida	.....	.....	.....	1	3	.....	.....	.....	.....	.....	.....	.....	.....
Georgia	80	60	41	52	83	12	7	.....	3	1	.....	.....	.....
Illinois	435	271	244	99	171	157	61	39	23	11	1	5	6
Indiana	39	15	17	21	23	56	6	10	15	10	10	5	.....
Iowa	26	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas	13	10	7	3	5	5	5	.....	.....	.....	.....	.....	.....
Kentucky	13	19	23	12	11	16	10	1	2	.....	1	1	.....
Louisiana	15	11	8	.....	15	15	5	10	.....	.....	.....	.....	.....
Maine	38	36	16	11	.....	3	2	1	.....	.....	.....	.....	.....
Maryland	210	82	166	72	133	259	206	34	8	1	3	3	4
Massachusetts	340	271	137	68	144	136	38	40	17	26	7	1	6
Michigan	160	103	133	51	75	366	108	46	142	23	7	2	24
Minnesota	9	7	17	10	9	21	16	.....	2	.....	1	1	.....
Missouri	340	149	151	48	111	156	31	70	37	4	.....	1	5
Nebraska	23	12	17	4	11	3	.....	1	.....	1	.....	.....	1
Nevada	25	10	8	.....	9	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	822	612	435	153	283	330	112	125	47	2	6	29	2
New York	1,186	1,231	1,067	338	777	907	297	175	197	87	39	40	41
North Carolina	40	16	16	11	13	2	.....	.....	.....	.....	.....	.....	2
Ohio	427	318	198	102	160	120	53	30	10	6	5	2	9
Oregon	1	3	7	6	15	6	1	2	.....	.....	1	.....	2
Pennsylvania	1,445	819	567	226	359	517	163	119	107	69	19	18	10
Rhode Island	38	26	20	15	19	4	1	1	1	.....	.....	1	.....
South Carolina	58	28	26	19	68	1	.....	.....	.....	.....	.....	1	.....
Tennessee	15	15	7	9	15	18	3	.....	11	1	.....	.....	3
Texas	2	7	33	7	4	.....	.....	.....	.....	.....	.....	.....	.....
Vermont	.....	1	1	.....	.....	1	1	.....	.....	.....	.....	.....	.....
Virginia	27	24	67	16	47	6	4	1	.....	1	.....	.....	.....
West Virginia	3	4	4	6	1	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin	11	26	6	8	8	16	14	1	1	.....	.....	.....	.....
All other states	2	3	11	4	8	.....	.....	.....	.....	.....	.....	.....	.....

TABLE 4.—AVERAGE NUMBER OF EMPLOYÉS AT THE DIFFERENT WEEKLY RATES OF PAY, CHEMICALS AND ALLIED PRODUCTS, BY STATES AND TERRITORIES: 1890—Continued.

STATES AND TERRITORIES.	WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF EMPLOYÉS AT EACH RATE, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK—continued								PIECEWORKERS.	
	Females above 15 years—Continued.				Children.					
	$12 and over but under $15.	$15 and over but under $20.	$20 and over but under $25.	$25 and over.	Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.	Average number.	Total wages.
The United States	60	24	5	6	290	249	37	4	1,720	$663,490
Alabama					1	1			6	400
California	2				6	6			5	9,700
Colorado										
Connecticut		1							9	8,618
Delaware									2	75
District of Columbia									6	1,134
Florida										
Georgia	1				7	7				
Illinois	9	1	1		12	7	3	2	11	4,335
Indiana									2	672
Iowa										
Kansas										
Kentucky		1			1	1			27	3,955
Louisiana										
Maine									3	170
Maryland					2	2			8	2,190
Massachusetts		1			3	1	2		35	17,965
Michigan	11	2	1		12	12			311	122,750
Minnesota	1				42	42				
Missouri	3	3	2		16	13	3		10	400
Nebraska					2	2				
Nevada									100	12,502
New Jersey	2	4		1	16	7	9		23	6,570
New York	21	5	1	4	68	66		2	656	244,703
North Carolina					10	10				
Ohio	1	3		1	21	21			83	37,567
Oregon										
Pennsylvania	9	3			56	36	20		378	175,439
Rhode Island									1	2,000
South Carolina					1	1			4	100
Tennessee									8	2,909
Texas					2	2				
Vermont									2	261
Virginia					11	11			25	7,200
West Virginia					1	1			4	1,800
Wisconsin									1	75
All other states										

TABLE 5.—NUMBER OF PROOF GALLONS OF ALL FORMS OF DISTILLED SPIRITS CONSUMED IN THE ARTS, MANUFACTURES, AND MEDICINE DURING THE YEAR ENDING DECEMBER 31, 1889, BY STATES AND TERRITORIES. (a)

STATES AND TERRITORIES.	Aggregate.	Alcohol.	Cologne spirit.	High wines.	Whisky.	Brandy.	Rum.	Gin.
The United States	10,976,842	6,745,152	1,453,048	75,992	2,023,900	266,874	189,581	222,295
Alabama	41,343	18,781	648	.....	19,961	714	237	1,002
Arizona	1,235	244	.....	.....	778	152	17	44
Arkansas	30,234	13,532	833	.....	12,846	1,314	50	1,659
California	294,572	170,948	74,613	7,663	29,236	6,630	1,562	3,920
Colorado	33,409	12,942	117	146	14,961	2,992	520	1,731
Connecticut	234,510	138,011	9,644	7,222	42,437	7,531	12,147	17,518
Delaware	11,063	7,949	581	15	2,012	260	49	197
District of Columbia	25,920	8,870	3,410	237	10,033	1,442	793	1,135
Florida	9,737	5,795	849	153	2,238	481	70	151
Georgia	143,153	97,668	32,236	285	11,378	857	188	541
Idaho	3,030	101	15	15	2,028	546	66	259
Illinois	1,306,332	721,552	231,190	18,698	267,022	31,383	4,552	31,935
Indiana	294,448	131,123	10,719	1,137	120,567	17,035	1,499	12,368
Indian territory	41	.....	.....	.....	20	16	.....	5
Iowa	189,962	98,354	6,525	101	74,206	5,431	898	4,447
Kansas	42,518	10,492	790	1,500	26,092	1,905	88	1,651
Kentucky	131,912	59,083	2,824	1,023	58,853	8,153	355	1,621
Louisiana	152,914	115,276	6,262	627	26,972	2,120	769	888
Maine	115,585	83,369	6,396	53	13,539	1,898	6,949	3,381
Maryland	243,951	187,209	28,154	1,983	20,096	2,039	2,718	1,752
Massachusetts	1,018,080	659,406	74,951	5,051	124,743	19,883	102,354	31,692
Michigan	494,839	350,449	20,133	117	89,688	14,513	3,288	10,651
Minnesota	183,090	125,890	13,583	216	33,794	6,208	692	2,653
Mississippi	16,231	5,493	150	.....	9,852	352	48	336
Missouri	1,071,068	655,824	120,688	1,955	253,756	22,641	2,213	13,991
Montana	6,394	4,653	9	.....	1,264	327	19	122
Nebraska	180,372	106,258	1,966	136	54,607	11,384	742	5,279
Nevada	2,118	248	.....	84	1,222	299	59	206
New Hampshire	59,465	27,133	1,057	75	16,518	2,418	7,447	4,817
New Jersey	176,175	123,909	22,922	1,338	18,372	4,868	1,335	3,431
New Mexico	3,619	500	38	.....	2,353	545	43	140
New York	1,760,343	1,107,696	366,164	18,386	197,551	29,581	16,727	24,238
North Carolina	14,661	4,841	81	.....	7,987	1,302	264	186
North Dakota	6,272	2,758	188	75	2,435	486	100	180
Ohio	647,339	412,151	37,550	1,321	162,001	16,781	3,243	14,292
Oklahoma	43	43	.....	.....	.....	.....	.....	.....
Oregon	85,917	60,732	8,135	7	12,851	2,851	244	1,097
Pennsylvania	1,142,941	703,625	305,574	1,902	102,711	14,497	5,768	8,864
Rhode Island	133,065	101,848	1,968	225	14,269	2,185	7,734	4,836
South Carolina	22,510	15,591	1,083	853	4,445	384	21	183
South Dakota	5,422	2,179	267	3	2,349	357	68	199
Tennessee	221,981	128,434	32,375	36	54,164	5,343	150	1,479
Texas	101,455	51,994	8,302	2,101	33,660	3,528	75	1,795
Utah	25,058	8,736	7,913	9	5,038	2,593	234	535
Vermont	43,412	30,744	1,820	33	7,213	751	1,653	1,198
Virginia	37,903	26,986	2,448	78	7,414	537	411	29
Washington	10,874	2,406	258	37	5,774	1,622	211	506
West Virginia	32,361	11,929	431	753	16,400	1,708	28	1,112
Wisconsin	164,728	123,675	7,150	343	25,071	5,756	813	1,920
Wyoming	3,231	1,722	38	.....	1,073	265	70	63

a Reported by manufacturers and wholesale druggists, eleemosynary institutions, and retail apothecaries.

TABLE 6.—RETURNS FROM MANUFACTURERS AND WHOLESALE DRUGGISTS OF DISTILLED SPIRITS USED IN THE ARTS, MANUFACTURES, AND MEDICINE IN ORDINARY GALLONS OR PROOF GALLONS, AS REPORTED DURING THE YEAR ENDING DECEMBER 31, 1889, BY STATES AND TERRITORIES.

STATES AND TERRITORIES.	ALCOHOL.		COLOGNE SPIRIT.		HIGH WINES.		WHISKY.		BRANDY.		RUM.		GIN.	
	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.
The United States	2,861,094	46,934	678,429	58,586	35,918	860	865,234	14,048	99,060	1,422	86,448	930	83,594	1,343
Alabama	6,956	.....	301	.....	.....	.....	9,360	.....	304	.....	64	.....	399	.....
Arizona	.....	.....	.....	.....	.....	.....	15	.....	15	.....	.....	.....	.....	.....
Arkansas	6,249	.....	303	.....	.....	.....	11,335	.....	1,095	.....	25	.....	1,496	.....
California	35,410	3,888	30,933	12,146	4,500	.....	6,385	51	1,008	25	410	.....	580	.....
Colorado	3,884	.....	30	.....	.....	89	1,103	.....	140	.....	35	.....	122	.....
Connecticut	33,121	.....	2,782	.....	3,394	.....	4,676	675	895	.....	2,019	.....	2,282	.....
Delaware	86	.....	138	.....	.....	.....	248	.....	26	.....	2	.....	1	.....
District of Columbia	40	.....	66	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....
Florida	.....	.....	.....	125	100	.....	300	.....	50	.....	25	.....	25	.....
Georgia	28,915	.....	15,358	.....	.....	.....	3,270	.....	135	.....	18	.....	76	.....
Illinois	360,972	.....	117,306	6,272	12,088	.....	213,807	203	22,373	.....	3,060	.....	26,870	.....
Indiana	57,831	.....	3,882	.....	.....	.....	23,851	12,075	2,833	1,230	383	256	3,218	1,213
Iowa	42,270	.....	3,142	.....	.....	.....	56,851	.....	3,685	.....	643	.....	3,014	.....
Kansas	2,704	.....	75	.....	589	.....	449	.....	75	.....	.....	.....	140	.....
Kentucky	25,439	.....	980	.....	.....	.....	7,675	.....	853	.....	65	.....	305	.....
Louisiana	59,127	.....	3,145	.....	.....	.....	16,045	.....	1,220	.....	527	.....	196	.....
Maine	34,917	.....	2,839	.....	.....	.....	2,917	.....	504	.....	1,895	.....	725	.....
Maryland	96,084	4,315	12,554	4,487	1,296	.....	14,139	.....	1,809	.....	2,061	322	1,400	42
Massachusetts	287,142	.....	32,392	.....	2,106	.....	29,343	.....	5,256	.....	56,849	.....	4,190	.....
Michigan	163,575	.....	9,339	.....	.....	.....	33,649	.....	5,414	.....	1,283	.....	4,560	.....
Minnesota	65,044	.....	7,142	.....	45	.....	22,871	.....	3,156	.....	302	.....	1,583	.....
Mississippi	1,132	.....	20	.....	.....	.....	250	.....	10	.....	.....	.....	46	.....
Missouri	322,330	20,815	57,336	11,481	259	771	155,888	.....	13,851	.....	1,482	310	9,055	.....
Montana	279	.....	.....	.....	.....	.....	40	.....	40	.....	.....	.....	5	.....
Nebraska	53,074	.....	970	.....	.....	.....	41,936	.....	8,924	.....	538	.....	4,253	.....
Nevada	.....	.....	.....	.....	.....	.....	65	.....	12	.....	.....	.....	2	.....
New Hampshire	2,340	.....	11	.....	.....	.....	765	.....	99	.....	503	.....	203	.....
New Jersey	40,743	.....	7,260	3,591	598	.....	505	.....	168	.....	204	.....	46	.....
New York	302,417	12,665	173,911	6,655	9,459	.....	42,594	102	5,757	120	4,298	.....	4,570	.....
North Carolina	658	.....	.....	.....	.....	.....	1,768	.....	161	.....	5	.....	.....	.....
North Dakota	.....	.....	.....	.....	.....	.....	76	.....	20	.....	.....	.....	.....	.....
Ohio	184,306	540	16,981	496	455	.....	84,904	439	9,416	.....	1,865	.....	7,551	.....
Oregon	30,553	.....	4,225	.....	.....	.....	200	.....	75	.....	10	.....	10	.....
Pennsylvania	266,560	.....	147,259	13,133	470	.....	37,284	.....	3,844	.....	3,852	.....	2,720	.....
Rhode Island	50,478	.....	910	.....	.....	.....	3,561	.....	669	.....	3,702	.....	2,274	.....
South Carolina	5,298	.....	190	177	559	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Dakota	.....	.....	.....	.....	.....	.....	120	.....	25	.....	.....	.....	25	.....
Tennessee	63,052	.....	16,809	.....	.....	.....	19,266	.....	2,276	.....	113	.....	800	.....
Texas	16,231	.....	4,025	.....	.....	.....	2,155	.....	375	.....	15	.....	30	.....
Utah	2,331	.....	1,636	.....	.....	.....	1,430	.....	701	.....	44	.....	106	.....
Vermont	5,752	.....	21	.....	.....	.....	40	.....	15	.....	5	.....	5	.....
Virginia	9,854	.....	837	.....	.....	.....	2,396	.....	321	.....	50	.....	.....	.....
Washington	.....	.....	.....	.....	.....	.....	1,475	.....	229	.....	15	.....	32	.....
West Virginia	4,169	.....	168	.....	.....	.....	6,066	.....	484	.....	10	.....	315	.....
Wisconsin	49,161	4,711	3,153	23	.....	.....	3,994	503	1,198	47	64	42	350	88
Wyoming	.....	.....	.....	.....	.....	.....	77	.....	44	.....	5	.....	5	.....

TABLE 7.—RETURNS FROM ELEEMOSYNARY INSTITUTIONS OF DISTILLED SPIRITS USED IN THE ARTS, MANUFACTURES, AND MEDICINE IN ORDINARY GALLONS OR PROOF GALLONS, AS REPORTED DURING THE YEAR ENDING DECEMBER 31, 1889, BY STATES AND TERRITORIES.

STATES AND TERRITORIES.	ALCOHOL.		COLOGNE SPIRIT.		HIGH WINES.		WHISKY.		BRANDY.		RUM.		GIN.	
	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.
The United States	14,895	2,090	2,327	.....	589	.....	55,275	3,947	6,597	2	841	.....	779	.....
Alabama	2	.....	.....	.....	.....	.....	164	.....	5	.....	.....	.....	2	.....
Arizona	15	.....	.....	.....	.....	.....	198	.....	11	.....	.....	.....	.....	.....
Arkansas	26	.....	.....	.....	.....	.....	309	.....	.....	.....	.....	.....	.....	.....
California	736	.....	.....	.....	.....	.....	2,296	.....	201	.....	.....	.....	60	.....
Colorado	11	.....	.....	.....	8	.....	682	.....	176	.....	30	.....	32	.....
Connecticut	234	.....	50	.....	1	.....	289	.....	67	.....	11	.....	7	.....
Delaware	.....	.....	.....	.....	.....	.....	197	.....	1	.....	.....	.....	.....	.....
District of Columbia	.....	442	1,433	.....	.....	.....	2,184	.....	383	.....	.....	.....	5	.....
Florida	.....	.....	.....	.....	.....	.....	7	.....	.....	.....	1	.....	.....	.....
Georgia	13	.....	.....	.....	.....	.....	2,411	.....	236	.....	108	.....	136	.....
Idaho	.....	.....	.....	.....	.....	.....	40	.....	10	.....	.....	.....	.....	.....
Illinois	1,290	.....	244	.....	79	.....	1,752	.....	281	.....	26	.....	57	.....
Indiana	10	.....	.....	.....	.....	.....	277	.....	39	.....	.....	.....	2	.....
Iowa	103	.....	.....	.....	.....	.....	128	.....	8	.....	.....	.....	2	.....
Kansas	22	.....	15	.....	.....	.....	126	.....	5	.....	.....	.....	1	.....
Kentucky	90	.....	.....	.....	.....	.....	972	819	10	.....	.....	.....	.....	.....
Louisiana	39	.....	.....	.....	20	.....	1,243	.....	174	.....	16	.....	21	.....
Maine	153	.....	.....	.....	.....	.....	575	.....	35	.....	5	.....	46	.....
Maryland	113	.....	.....	.....	1	.....	736	248	91	.....	1	.....	5	.....
Massachusetts	861	.....	.....	.....	37	.....	1,442	.....	947	.....	172	.....	97	.....
Michigan	705	.....	453	.....	2	.....	763	.....	66	.....	2	.....	1	.....
Minnesota	70	.....	.....	.....	20	.....	361	.....	109	.....	.....	.....	1	.....
Mississippi	.....	.....	.....	.....	.....	.....	227	.....	3	.....	.....	.....	.....	.....
Missouri	258	.....	16	.....	65	.....	2,594	118	66	.....	4	.....	16	.....
Montana	.....	.....	.....	.....	.....	.....	29	.....	.....	.....	.....	.....	3	.....
Nebraska	17	.....	20	.....	.....	.....	91	.....	7	.....	.....	.....	2	.....
Nevada	7	.....	.....	.....	.....	.....	35	.....	2	.....	1	.....	1	.....
New Hampshire	15	.....	.....	.....	.....	.....	34	.....	6	.....	.....	.....	5	.....
New Jersey	234	.....	.....	.....	20	.....	1,388	.....	410	.....	2	.....	68	.....
New Mexico	.....	.....	.....	.....	.....	.....	9	.....	.....	.....	.....	.....	.....	.....
New York	4,687	1,000	41	.....	118	.....	11,949	726	1,324	.....	109	.....	85	.....
North Carolina	8	.....	.....	.....	.....	.....	502	1	25	.....	1	.....	3	.....
North Dakota	41	.....	.....	.....	.....	.....	24	.....	13	.....	.....	.....	5	.....
Ohio	1,250	.....	.....	.....	67	.....	4,408	100	123	.....	12	.....	7	.....
Oregon	148	.....	.....	.....	.....	.....	150	.....	40	.....	.....	.....	20	.....
Pennsylvania	2,595	648	.....	.....	10	.....	5,107	1,291	366	.....	5	.....	30	.....
Rhode Island	47	.....	.....	.....	.....	.....	137	.....	74	.....	.....	.....	.....	.....
South Carolina	123	.....	.....	.....	.....	.....	621	.....	2	.....	.....	.....	.....	.....
South Dakota	.....	.....	.....	.....	2	.....	1	.....	.....	.....	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....	4	.....	6,224	.....	1,022	.....	.....	.....	6	.....
Texas	48	.....	.....	.....	106	.....	608	.....	62	.....	.....	.....	17	.....
Vermont	44	.....	55	.....	.....	.....	63	.....	10	.....	.....	.....	7	.....
Virginia	285	.....	.....	.....	.....	.....	2,564	644	94	2	334	.....	13	.....
Washington	42	.....	.....	.....	10	.....	107	.....	56	.....	1	.....	6	.....
West Virginia	50	.....	.....	.....	.....	.....	292	.....	.....	.....	.....	.....	.....	.....
Wisconsin	503	.....	.....	.....	10	.....	959	.....	37	.....	.....	.....	1	.....

TABLE 8.—RETURNS FROM RETAIL APOTHECARIES OF DISTILLED SPIRITS USED IN THE ARTS, MANUFACTURES, AND MEDICINE IN ORDINARY GALLONS OR PROOF GALLONS, AS REPORTED DURING THE YEAR ENDING DECEMBER 31, 1889, BY STATES AND TERRITORIES.

STATES AND TERRITORIES.	ALCOHOL.		COLOGNE SPIRIT.		HIGH WINES.		WHISKY.		BRANDY.		RUM.		GIN.	
	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.	Ordinary gallons.	Proof gallons.
The United States	682,387	6,382	59,587	2,618	13,525	85	1,074,425	10,971	158,260	933	100,702	660	135,337	1,242
Alabama	2,757	517	34	18	.....	.....	9,846	591	405	.....	147	26	601	.....
Arizona	115	.....	.....	.....	.....	.....	565	.....	126	.....	17	.....	44	.....
Arkansas	923	.....	140	.....	.....	.....	1,202	.....	219	.....	25	.....	163	.....
California	2,473	456	2,294	.....	609	.....	20,454	50	5,386	10	1,147	5	3,275	5
Colorado	2,989	.....	32	.....	30	.....	12,086	1,000	2,676	.....	455	.....	1,577	.....
Connecticut	40,055	.....	2,298	.....	1,413	10	35,936	861	6,444	125	9,843	274	14,726	503
Delaware	4,142	.....	171	.....	10	.....	1,567	.....	233	.....	47	.....	196	.....
District of Columbia	4,443	.....	315	.....	158	.....	7,849	.....	1,059	.....	791	.....	1,130	.....
Florida	2,955	240	385	.....	2	.....	1,931	.....	431	.....	44	.....	126	.....
Georgia	23,023	.....	1,789	.....	190	.....	5,007	.....	484	2	62	.....	314	15
Idaho	35	35	8	.....	10	.....	1,088	.....	536	.....	66	.....	259	.....
Illinois	21,542	.....	2,034	100	298	.....	50,890	370	8,698	31	1,466	.....	5,002	6
Indiana	11,385	978	1,027	1,490	758	.....	83,232	1,132	12,865	68	860	.....	7,905	30
Indian territory	.....	.....	.....	.....	.....	.....	20	.....	16	.....	.....	.....	5	.....
Iowa	9,943	.....	329	.....	67	.....	17,227	.....	1,738	.....	255	.....	1,431	.....
Kansas	2,855	.....	330	.....	411	.....	25,517	.....	1,825	.....	88	.....	1,510	.....
Kentucky	5,898	.....	522	.....	682	.....	49,122	265	7,290	.....	290	.....	1,108	208
Louisiana	2,151	.....	186	.....	389	.....	9,684	.....	726	.....	226	.....	671	.....
Maine	9,275	.....	563	.....	35	.....	10,047	.....	1,359	.....	5,049	.....	2,610	.....
Maryland	487	.....	35	.....	25	.....	4,073	.....	639	.....	334	.....	305	.....
Massachusetts	62,081	120	7,473	5	1,224	.....	93,385	573	13,630	50	45,193	140	27,281	124
Michigan	25,294	50	917	.....	76	.....	55,188	88	8,983	50	2,003	.....	6,070	20
Minnesota	1,849	.....	83	.....	79	.....	10,498	64	2,987	16	389	1	1,036	33
Mississippi	1,790	.....	60	.....	.....	.....	9,375	.....	339	.....	48	.....	290	.....
Missouri	15,183	.....	471	500	465	.....	94,550	606	8,684	40	417	.....	4,890	30
Montana	2,196	.....	5	.....	.....	.....	1,195	.....	287	.....	19	.....	114	.....
Nebraska	3,423	12	56	.....	91	.....	12,580	.....	2,453	.....	204	.....	1,024	.....
Nevada	125	.....	.....	.....	56	.....	1,122	.....	285	.....	58	.....	203	.....
New Hampshire	11,947	245	551	.....	50	.....	15,512	207	2,261	52	6,914	30	4,547	62
New Jersey	23,770	2,185	2,996	50	274	.....	16,931	548	3,986	304	1,009	120	3,277	40
New Mexico	266	.....	20	.....	.....	.....	2,344	.....	545	.....	43	.....	140	.....
New York	184,243	1,099	17,178	185	2,630	75	130,886	2,294	22,262	118	12,207	53	19,501	82
North Carolina	1,909	.....	43	.....	.....	.....	5,716	.....	1,116	.....	258	.....	183	.....
North Dakota	1,426	.....	100	.....	50	.....	2,385	.....	453	.....	100	.....	175	.....
Ohio	33,386	.....	2,633	180	359	.....	71,805	345	7,222	20	1,356	10	6,694	40
Oklahoma	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oregon	1,603	.....	102	.....	5	.....	12,501	.....	2,736	.....	234	.....	1,067	.....
Pennsylvania	104,631	259	8,247	90	788	.....	58,360	669	10,283	4	1,910	1	6,103	2
Rhode Island	3,644	10	137	.....	150	.....	10,571	.....	1,442	.....	4,032	.....	2,562	.....
South Carolina	2,859	25	292	.....	10	.....	3,824	.....	332	.....	21	.....	183	.....
South Dakota	1,159	.....	142	.....	.....	.....	2,218	10	332	.....	68	.....	174	.....
Tennessee	5,264	.....	412	.....	20	.....	28,674	.....	2,045	.....	37	.....	673	.....
Texas	11,297	151	391	.....	1,295	.....	29,645	1,252	3,049	42	60	.....	1,727	21
Utah	2,316	.....	2,573	.....	6	.....	3,608	.....	1,892	.....	190	.....	429	.....
Vermont	10,547	.....	892	.....	22	.....	7,070	40	726	.....	1,648	.....	1,166	20
Virginia	4,215	.....	465	.....	52	.....	1,810	.....	120	.....	27	.....	16	.....
Washington	1,238	.....	137	.....	15	.....	4,192	.....	1,337	.....	195	.....	528	.....
West Virginia	2,126	.....	61	.....	502	.....	10,042	.....	1,224	.....	18	.....	797	.....
Wisconsin	13,615	.....	638	.....	219	.....	19,609	6	4,473	1	707	.....	1,471	1
Wyoming	916	.....	20	.....	.....	.....	996	.....	221	.....	65	.....	58	.....

GLASS.

GLASS.

BY JOSEPH D. WEEKS.

SCOPE OF THE REPORT.

The investigations which form the basis of this report correspond to those at the census of 1880, and are described in the monograph on the manufacture of glass for the Tenth Census, as follows: "The investigations were confined exclusively to those works which manufacture glass from the crude material, or make the 'metal', as it is termed, and do not include any statistics of those establishments in which manufactured glass is a raw material; or, in other words, this report only covers establishments in which glass is made, not those in which it is reworked, and does not, therefore, include statistics of manufactories of painted or stained glass, mirrors, chemists' ware, etc. In cases, however, where the glass is reworked in the same establishment in which it is made, as where rough plate is polished or glassware is engraved or decorated, the tables include the statistics of such reworking, it being regarded as only a part of the manufacture of glass in these works, or as having such a close relation with its manufacture as to make it practically impossible to separate the statistics of the crude from the reworked glass". The year covered by this report is the census year ending May 31, 1890.

The classification adopted in the collection of the statistics for the Eleventh Census follows the same division of the industry into four branches as that used in 1880. It is not, however, to be regarded as a complete classification of glass, but as one made necessary by the conditions of its manufacture in this country. This classification is as follows:

1. Plate glass factories, including those making rough, ribbed, or polished plate for window glass, mirrors, skylights, partitions, etc. This class also includes rolled cathedral plate.

2. Window glass factories, including those manufacturing cylinder or sheet window glass.

3. Glassware factories, including those manufacturing flint (lead or lime) glass, both blown and pressed, lamp chimneys, and flint druggists' and chemists' ware.

4. Green and black glass factories, including those producing green, black, amber, etc., bottles, fruit jars, carboys, demijohns, and other hollow ware, and green druggists' ware.

The statistical results for the industry in its entirety at the census of 1890 are summarized as follows:

SUMMARY OF GLASS MANUFACTURE: 1890.

Number of establishments reporting	294
Capital	$40,966,850
Miscellaneous expenses	$2,267,696
Average number of employés (aggregate)	45,987
Total wages	$22,118,522
Officers, firm members, and clerks:	
Average number	1,095
Total wages	$1,232,561
All other employés:	
Average number	44,892
Total wages	$20,885,961
Cost of materials used	$12,140,985
Value of products	$41,051,004
Number of furnaces	564
Number of pots in furnaces	4,932

No preceding census inquiry has comprehended data relating to the cost of manufacture other than statistics of wages and materials. The current inquiry was designed to embrace the entire cost of production other than what is involved in use of capital and plant, for interest, and depreciation.

The difference between the cost and the value shown must not, however, be taken as indicating the profit or earnings of capital, because these statistics contain no information relating to cost of selling, mercantile losses, and depreciation of plant. The census inquiry was intended to ascertain only the relations which capital, miscellaneous expenses, wages, and cost of materials used bear to the value at the works of the products of manufacturing industry, excluding all cost or expense pertaining to the mercantile portion of the business.

In the statement on the following page the data for the entire industry are distributed to the various branches which have been described, and the proportion borne to the whole industry by the respective items shown for each branch is indicated by the percentages stated.

SUMMARY SHOWING THE PERCENTAGE OF EACH ITEM TO ITS TOTAL FOR THE ENTIRE INDUSTRY, GLASS MANUFACTURE, BY BRANCHES: 1890.

ITEMS.	AGGREGATE GLASS MANUFACTURE.		PLATE GLASS.		WINDOW GLASS.		GLASSWARE.		GREEN AND BLACK GLASS.	
	Total.	Percentage.	Total.	Percentage.	Total.	Percentage.	Total.	Percentage.	Total.	Percentage.
Number of establishments reporting	294	100.00	16	5.44	84	28.57	125	42.52	69	23.47
Capital	$40,966,850	100.00	$10,233,641	24.98	$8,119,935	19.82	$15,448,196	37.71	$7,165,078	17.49
Miscellaneous expenses	$2,267,696	100.00	$510,238	22.50	$559,307	24.66	$865,115	38.15	$333,036	14.69
Average number of employés (aggregate)	45,987	100.00	4,761	10.35	7,513	16.34	23,313	50.69	10,400	22.62
Total wages	$22,118,522	100.00	$2,417,141	10.93	$5,080,874	22.97	$10,166,203	45.96	$4,454,304	20.14
Officers, firm members, and clerks:										
Average number	1,095	100.00	122	11.14	170	15.52	595	54.34	208	19.00
Total wages	$1,232,561	100.00	$170,204	13.81	$167,908	13.62	$696,647	56.52	$197,802	16.05
All other employés:										
Average number	44,892	100.00	4,639	10.33	7,343	16.36	22,718	50.61	10,192	22.70
Total wages	$20,885,961	100.00	$2,246,937	10.76	$4,912,966	23.52	$9,469,556	45.34	$4,256,502	20.38
Cost of materials used	$12,140,985	100.00	$1,894,630	15.60	$2,726,905	22.46	$4,925,234	40.57	$2,594,216	21.37
Value of products	$41,051,004	100.00	$4,869,494	11.86	$9,058,802	22.07	$18,601,244	45.31	$8,521,464	20.76
Number of furnaces	564	100.00	49	8.69	146	25.88	238	42.20	131	23.23
Number of pots in furnaces	4,932	100.00	725	14.70	1,299	26.34	2,311	46.86	597	12.10

IDLE ESTABLISHMENTS.

From the returns received it appears that 23 establishments were idle during the census year. The following statements present the data concerning these establishments, first, by totals for the United States in each branch of the industry; second, by totals for each state in the entire industry:

DETAILED STATEMENT OF IDLE ESTABLISHMENTS, GLASS MANUFACTURE, BY BRANCHES: 1890.

BRANCHES.	Number of establishments.	Capital.	Number of furnaces.	Number of pots.	Number of casting tables.	Number of annealing ovens.	Number of grinding machines.	Number of clay grinding mills.	Number of flattening ovens.	Number of glory holes.	Number of presses or pressing machines.	Number of leers.	Number of shops.	Number of grinding and engraving machines.	Number of horses.	Number of carts.	Number of drays.
Total	23	$614,748	29	239	1	78	5	3	3	23	3	12	59	18	3	2	2
Plate glass	1	9,000	1	4	1	5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Window glass	5	111,800	7	68	.....	.....	.....	1	3	.....	.....	.....	.....	.....	.....	.....	.....
Glassware	9	299,126	13	116	.....	6	.....	1	.....	11	3	12	19	18	1	.....	1
Green and black glass.	8	194,822	8	51	.....	67	4	1	.....	12	.....	.....	40	.....	2	2	1

DETAILED STATEMENT OF IDLE ESTABLISHMENTS, GLASS MANUFACTURE, BY STATES AND TERRITORIES: 1890.

STATES AND TERRITORIES.	Number of establishments.	Capital.	Number of furnaces.	Number of pots.	Number of casting tables.	Number of annealing ovens.	Number of grinding machines.	Number of clay grinding mills.	Number of flattening ovens.	Number of glory holes.	Number of presses or pressing machines.	Number of leers.	Number of shops.	Number of grinding and engraving machines.	Number of horses.	Number of carts.	Number of drays.
The United States	23	$614,748	29	239	1	78	5	3	3	23	3	12	59	18	3	2	2
Colorado	1	45,000	1	8	.....	3	.....	.....	.....	2	.....	2	.....	1	.....	.....	.....
Illinois	1	19,000	1	8	.....	8	.....	.....	.....	4	.....	.....	10	.....	.....	.....	.....
Kansas	1	29,000	1	10	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....
Kentucky	2	40,000	2	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts	1	25,000	4	34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minnesota	1	15,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Missouri	1	15,000	1	10	.....	3	.....	1	.....	2	.....	2	7	1	1	.....	1
New Jersey	1	24,500	2	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New York	2	30,300	2	18	.....	16	1	1	.....	.....	.....	.....	11	.....	1	1	1
Ohio	8	217,948	12	91	1	40	3	.....	2	15	3	8	31	16	1	1	.....
Pennsylvania	3	137,000	2	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah	1	17,000	1	6	.....	8	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

There were 23 establishments, having a capital of $591,000, with 27 furnaces containing 215 pots, reported as idle at the census of 1880; also 11 establishments in part idle, having 14 furnaces containing 134 pots entirely idle.

No inquiry was made at the census of 1890 respecting new plants in process of construction, therefore no data are available for comparison with the statistics published in the report for 1880.

The following comparative summary includes only statistics for establishments actively engaged in the production of glass as reported at both census periods:

COMPARATIVE SUMMARY, WITH PERCENTAGES OF INCREASE, GLASS MANUFACTURE, BY BRANCHES: 1880 AND 1890.

ITEMS.	Year.	AGGREGATE GLASS MANUFACTURE.		PLATE GLASS.		WINDOW GLASS.		GLASSWARE.		GREEN AND BLACK GLASS.	
		Total.	Percentage of increase.	Total.	Percentage of increase.	Total.	Percentage of increase.	Total.	Percentage of increase.	Total.	Percentage of increase.
Number of establishments reporting.	1880	169	.....	5	.....	49	.....	73	.....	42	.....
	1890	294	73.96	16	220.00	84	71.43	125	71.23	69	64.29
Capital	1880	$18,804,599	.....	$2,587,060	.....	$4,703,155	.....	$6,907,278	.....	$4,607,166	.....
	1890	$40,966,850	117.86	$10,233,641	295.58	$8,119,935	72.65	$15,448,196	123.65	$7,165,078	55.52
Miscellaneous expenses (*a*)	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	$2,267,696	.....	$510,238	.....	$559,307	.....	$865,115	.....	$333,036	.....
Average number of employés (aggregate). (*b*)	1880	24,177	.....	956	.....	3,890	.....	12,640	.....	6,691	.....
	1890	45,987	.....	4,761	.....	7,513	.....	23,313	.....	10,400	.....
Total wages	1880	$9,144,100	.....	$292,253	.....	$2,139,536	.....	$4,452,417	.....	$2,259,894	.....
	1890	$22,118,522	.....	$2,417,141	.....	$5,080,874	.....	$10,166,203	.....	$4,454,304	.....
Officers, firm members, and clerks: (*c*)											
Average number	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	1,095	.....	122	.....	170	.....	595	.....	208	.....
Total wages	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	$1,232,561	.....	$170,204	.....	$167,908	.....	$696,647	.....	$197,802	.....
All other employés: (*c*)											
Average number	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	44,892	.....	4,639	.....	7,343	.....	22,718	.....	10,192	.....
Total wages	1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1890	$20,885,961	.....	$2,246,937	.....	$4,912,966	.....	$9,469,556	.....	$4,256,502	.....
Cost of materials used	1880	$8,028,621	.....	$438,457	.....	$1,849,530	.....	$3,292,380	.....	$2,448,254	.....
	1890	$12,140,985	51.22	$1,894,630	332.11	$2,726,905	47.44	$4,925,234	49.59	$2,594,216	5.96
Value of products	1880	$21,154,571	.....	$868,305	.....	$5,047,313	.....	$9,568,520	.....	$5,670,433	.....
	1890	$41,051,004	94.05	$4,869,404	460.80	$9,058,802	79.48	$18,601,244	94.40	$8,521,464	50.28
Number of furnaces	1880	288	.....	8	.....	76	.....	130	.....	74	.....
	1890	564	95.83	49	512.50	146	92.11	238	83.08	131	77.03
Number of pots in furnaces	1880	2,439	.....	84	.....	665	.....	1,247	.....	443	.....
	1890	4,932	102.21	725	763.10	1,299	95.34	2,311	85.32	597	34.76

a Not reported at the census of 1880.

b The schedule used at the census of 1880 called for the "total number of employés"; the schedule used at the census of 1890 called for the average number employed during the year, including officers, firm members, and clerks.

c Not reported separately at the census of 1880.

The preceding statement shows a high rate of increase during the decade, the greatest change of general conditions having occurred in the manufacture of plate glass, which has increased its capital nearly threefold, and the value of its product nearly fivefold.

A correct statement of the percentage of increase in the number of employés or the total amount of wages can not be made, because a wide difference exists in the form of inquiry used at the two census periods. At the census of 1880 the schedule of inquiry used for the glass industry called for the "total number of employés" and the "total amount of wages and earnings paid all classes of labor during the year". The schedule used at the census of 1890 called for the total wages and the "average number employed during the year", that is, the average number employed during the entire term of operation of each establishment during the census year. These data were obtained for the following classes of employés: first, operatives, engineers, and other skilled workmen, overseers, and foremen or superintendents (not general superintendents or managers); second, officers, or firm members; third, clerks; fourth, watchmen, laborers, teamsters, and other unskilled workmen; fifth, pieceworkers. The data concerning employés and wages are presented in detail in Tables 7 and 8, accompanying this report.

CAPITAL.

The different items reported as capital at the census of 1890 in the various branches of the industry are shown in detail in Tables 2, 3, 4, 5, and 6.

The total capital reported for the manufacture of all kinds of glass was distributed in the proportions to the various branches of the industry at the census periods of 1880 and 1890, respectively, as shown in the table on the following page.

STATEMENT OF RELATIVE AMOUNT OF CAPITAL TO EACH BRANCH OF GLASS MANUFACTURE: 1880 AND 1890.

BRANCHES.	CAPITAL.		PERCENTAGE OF TOTAL.	
	1880	1890	1880	1890
Total	$18,804,599	$40,966,850	100.00	100.00
Plate glass	2,587,000	10,231,641	13.76	24.98
Window glass	4,703,155	8,119,935	25.01	19.82
Glassware	6,907,278	15,448,196	36.73	37.71
Green and black glass	4,607,166	7,165,078	24.50	17.49

The average amount of capital employed to produce $1 value of product in each branch of the industry, as indicated by the results of the inquiries at the censuses of 1880 and 1890, is as follows:

AMOUNT OF CAPITAL TO PRODUCE $1 OF PRODUCT IN EACH BRANCH OF GLASS MANUFACTURE: 1880 AND 1890.

BRANCHES.	AVERAGE CAPITAL PER $1 OF PRODUCT.	
	1880	1890
Total	$0.89	$1.00
Plate glass	2.98	2.10
Window glass	0.93	0.90
Glassware	0.72	0.83
Green and black glass	0.81	0.84

The comparatively large amount of capital required to a product of one dollar in the manufacture of plate glass, $2.98 in 1880 and $2.10 in 1890, is due to the employment of costly machinery to an extent not required in the other branches of the industry and also to the necessity of carrying a large amount of glass at the works between the casting and the finishing, both of these items being reported as capital.

WAGES AND MATERIALS.

The changed proportion of cost for wages and materials used, in their relation to the value of products as reported at the two census periods, is shown by the following comparison of the percentage which each constitutes of the total value of products by the respective branches of the industry:

COMPARATIVE STATEMENT, PERCENTAGE OF WAGES AND MATERIALS USED IN THE VALUE OF PRODUCT, GLASS MANUFACTURE, BY BRANCHES: 1880 AND 1890.

BRANCHES.	PERCENTAGE OF PRODUCT.	
	1880	1890
Total:		
Wages	43.23	53.88
Materials	37.95	29.58
Plate glass:		
Wages	33.60	49.64
Materials	50.50	38.91
Window glass:		
Wages	42.39	56.09
Materials	36.64	30.10
Glassware:		
Wages	46.53	54.65
Materials	34.41	26.48
Green and black glass:		
Wages	39.85	52.27
Materials	43.18	30.44

In considering the increase shown in this statement of the percentage that wages is of product, between 1880 and 1890, attention is called to the change in the form of inquiry respecting wages.

The schedule of inquiry contained a series of questions designed to obtain the total cost of materials used in the manufacture of the products reported, and also the quantity and cost of each of the specified classes of materials. The results of the inquiry are presented under the appropriate headings of the tables for the manufacture as a whole and also for its several branches, but they should not be accepted as statements of the exact quantities and cost of the respective classes or kinds of materials, because, in some instances, the cost of the raw material is represented by the labor expended upon it. Under the head of fuel there are instances of manufacturers using natural gas who report no specific cost therefor, because it proceeds from wells on their premises, and the annual cost of labor and piping connected with its use is comprehended by replies under other heads. The following materials not specified in the tables are among those included in the column headed "All other materials": emery, cotton cloth, felt, plaster of paris, fire brick, red brick, furnace stone, iron castings, cannel coal, charcoal, wrought iron, oxide of cobalt, zaffer, beeswax, black lead, and supplies used for ordinary repair of furnace.

VALUE OF PRODUCTS.

The following table shows the relative value of the products of each branch of the industry at the census periods of 1880 and 1890, respectively:

RELATIVE VALUE OF PRODUCTS FOR EACH BRANCH OF THE GLASS MANUFACTURE: 1880 AND 1890.

BRANCHES.	VALUE OF PRODUCTS.		PERCENTAGE OF TOTAL VALUE.	
	1880	1890	1880	1890
Total	$21,154,571	$41,051,004	100.00	100.00
Plate glass	868,305	4,869,494	4.10	11.86
Window glass	5,047,313	9,058,802	23.86	22.07
Glassware	9,568,520	18,601,244	45.23	45.31
Green and black glass	5,670,433	8,521,464	26.81	20.76

The following table shows the relative productive rank of the various states in which glass was manufactured in 1880 and 1890, and the percentage which the product of each state constitutes of the total value of products in the United States:

COMPARATIVE STATEMENT, STATES RANKED ACCORDING TO VALUE OF PRODUCT IN GLASS MANUFACTURE: 1880 AND 1890.

STATES.	RANK.		VALUE OF PRODUCTS.		PERCENTAGE OF TOTAL VALUE.		STATES.	RANK.		VALUE OF PRODUCTS.		PERCENTAGE OF TOTAL VALUE.	
	1880	1890	1880	1890	1880	1890		1880	1890	1880	1890	1880	1890
The United States	.....	.....	$21,154,571	$41,051,004	100.00	100.00	Kentucky	11	11	$388,405	(a)	1.84	.....
Pennsylvania	1	1	8,720,584	17,179,137	41.22	41.85	Georgia	.....	12	.....	(a)	.....	.....
Ohio	4	2	1,549,320	5,649,182	7.32	13.76	Wisconsin	.....	13	.....	(a)	.....	.....
New Jersey	2	3	2,810,170	5,218,152	13.28	12.71	California	13	14	140,000	(a)	0.66	.....
Indiana	8	4	790,781	2,995,409	3.74	7.30	Colorado	.....	15	.....	(a)	.....	.....
New York	3	5	2,420,796	2,723,019	11.44	6.63	Delaware	.....	16	.....	(a)	.....	.....
Illinois	6	6	901,343	2,372,011	4.26	5.78	Michigan	14	17	90,000	(a)	0.43	.....
Maryland	10	7	587,000	1,256,697	2.77	3.06	Connecticut	12	.....	160,000	.....	0.76	.....
Missouri	5	8	919,827	1,215,329	4.35	2.96	New Hampshire	15	.....	70,000	.....	0.33	.....
West Virginia	9	9	748,500	945,234	3.54	2.30	Iowa	16	.....	3,500	.....	0.02	.....
Massachusetts	7	10	854,345	431,437	4.04	1.05	All other states (a)	.....	.....	.....	$1,065,397	.....	2.60

a Includes states in which less than 3 establishments were in operation during the census year 1890, so that the operations of individual establishments may not be disclosed. These establishments were distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1.

To enable a complete comparison of the statistics relating to glass manufacture as reported at the censuses of 1880 and 1890, all the data common to both periods are presented in Table 1 by totals for the United States and for each state having 3 or more establishments. This table includes the number of idle establishments reported for both years, also the value of works being built in 1880.

Table 2 shows by totals for the United States and for each state having 3 or more establishments the data reported by 294 establishments which made glass during the census year 1890, and constitutes a statistical presentation of the glass manufacture in its entirety. In tables from 3 to 6, inclusive, these statistics are distributed to the different branches of the industry, namely, plate glass, window glass, glassware, and green and black glass.

PLATE GLASS.

Table 3 contains the statistics reported at the census of 1890 relating to the manufacture of plate glass by 16 establishments.

From the data reported it appears that the total value of products was $4,869,494; the total quantity of glass cast was 19,319,509 square feet. Of this quantity 3,106,831 square feet valued at $337,057 were sold in the rough state, 2,773,824 square feet valued at $279,407 were made into cathedral glass, and 9,100,111 square feet were made into polished plate valued at $4,172,484. The value of other products, consisting of opalescent glass disks, dock lights, ribbed glass, etc., was $80,546.

The quantity unaccounted for is 4,338,743 square feet, or 22.46 per cent of the total quantity cast. This represents the quantity of cast plate in process of manufacture, also of rough plate broken up and used as cullet, and also of opalescent glass disks, dock lights, ribbed glass, etc., the quantity of which was not reported. It appears that the average value per square foot of polished plate was 45.85 cents as compared with 76.20 cents in 1880; the increase in quantity of production was 773.33 per cent, while the decrease in value per square foot was 39.83 per cent.

WINDOW GLASS.

Table 4 contains the statistics reported at the census of 1890 relating to the manufacture of window glass by 84 establishments.

This table presents only the totals for the United States and for the states of Indiana, New Jersey, and Pennsylvania; the totals for Illinois, Maryland, New York, and Ohio having 3, 4, 8, and 21 establishments, respectively, in addition to other states in which there were less than 3 establishments, have been grouped in one sum. If the totals for these states were separately published in connection with similar totals for the other branches of the industry and for the entire industry, the operations of individual establishments in those branches in which there are less than 3 establishments could be identified by deducting from the totals for the entire industry, in the states named above, the totals for those branches of the industry in which there are 3 or more establishments.

It appears that the total quantity of window glass produced by the 84 establishments was 3,768,884 boxes of 50 square feet, valued at $9,037,187, or an average of $2.40 per box, as compared with $2.71 in 1880. The increase in the quantity produced is 102.11 per cent, while the increase in its value is 79.05 per cent. The decrease in the average value per box is 11.44 per cent.

GLASSWARE.

Table 5 contains statistics reported at the census of 1890 relating to the manufacture of glassware by 125 establishments.

The products of this branch of the glass industry comprise flint or lead and lime glassware, both blown and pressed; lamps and lamp chimneys, and flint druggists' and chemists' ware.

An attempt was made to ascertain the total number of pieces of certain kinds of glassware made; the data obtained are, however, far from complete and do not represent the total quantity or total value of the different classes. They may be taken as an indication of the relative values per unit of the respective classes of product, and are stated as follows:

TUMBLERS AND GOBLETS.

STATES.	Number of gross.	Value.	Average value per gross.
Ohio	453,225	$555,273	$1.23
Pennsylvania	206,800	780,059	3.77

LAMPS.

STATES.	Number of dozen.	Value.	Average value per dozen.
Ohio	66,833	$110,550	$1.65
Pennsylvania	87,058	174,900	2.01

LAMP CHIMNEYS.

STATES.	Number of dozen.	Value.	Average value per dozen.
New York	623,512	$256,541	$0.41
Ohio	4,025,120	541,836	0.13
Pennsylvania	2,885,841	1,017,039	0.35

FLINT BOTTLES, PRESCRIPTION AND FLASKS.

STATES.	Number of gross.	Value.	Average value per gross.
Illinois	12,000	$30,000	$2.50
Indiana	177,000	479,679	2.71
Maryland	170,497	509,900	2.99
New York	8,708	37,500	4.31
Ohio	65,436	151,486	2.32
Pennsylvania	823,889	2,083,952	2.53

GREEN AND BLACK GLASS.

Table 6 contains the statistics reported at the census of 1890 relating to the manufacture of green and black glass by 69 establishments.

The products of this branch of the glass industry comprise green and black bottles and vials, beer bottles, fruit jars, demijohns, carboys, telegraph insulators, and similar articles made of green or black glass.

An attempt was made to ascertain the number of pieces in certain classes of products, but the data are not complete. The totals of the returns which contained specific statements of products are as follows, but may only be taken as an indication of average values per unit and not as representing the total value or quantity of the respective classes of product.

GREEN AND BLACK BOTTLES ABOVE 8 OUNCE, NOT INCLUDING FRUIT JARS AND BEER BOTTLES.

STATES.	Number of gross.	Value.	Average value per gross.
Illinois	44,298	$225,898	$5.10
Maryland	5,600	33,000	5.89
Missouri	4,748	20,627	4.34
New Jersey	75,266	234,881	3.12
New York	19,491	90,403	4.64
Ohio	1,123	5,052	4.50
Pennsylvania	72,661	359,565	4.95

VIALS, 8 OUNCE AND UNDER.

California	10,000	37,000	3.70
Colorado	1,904	5,326	2.80
Maryland	65,350	130,700	2.00
New Jersey	343,487	665,506	1.94
New York	59,856	86,958	1.45
Ohio	3,200	9,600	3.00
Pennsylvania	206,447	194,337	0.94

BEER BOTTLES.

Illinois	127,079	597,012	4.70
Kentucky	6,000	30,000	5.00
Maryland	8,750	35,000	4.00
New Jersey	37,369	113,489	3.04
New York	25,750	96,170	3.73

FRUIT JARS.

California	2,000	18,000	9.00
Colorado	3,983	19,436	4.88
Illinois	20,750	103,798	5.00
Indiana	83,270	440,657	5.29
Kentucky	6,000	30,000	5.00
Missouri	2,093	12,939	6.18
New Jersey	33,406	181,410	5.43
New York	9,500	55,000	5.79
Ohio	60,726	296,065	4.88
Pennsylvania	47,250	233,125	4.93

The total number of carboys reported specifically was 23,416, valued at $12,925; the total number of demijohns reported was 2,139 gross, valued at $62,304.

EMPLOYÉS AND WAGES, BY CLASSES AND OCCUPATIONS.

Table 7 contains statistics showing by classes the average number of men, women, and children employed in the manufacture of glass during the census year 1890, and the average weekly earnings of each number in the respective classes, excepting pieceworkers.

It should be borne in mind that the number of hands reported is the average number employed during the year, that is, the average number having continuous employment for the full time reported by individual establishments. Upon this basis the computations are made to obtain the average weekly earnings. The average number of employés reported for each establishment is multiplied by the number of weeks embraced by its term of operation; the result is the number of weeks required for 1 employé to perform the labor. Aggregating such results of individual reports, the number of weeks required for 1 employé to perform the entire labor is obtained. This number, used as a divisor for the total wages reported, produces the true average weekly earnings.

The table includes officers, firm members, and clerks; it also shows the distribution of the average number of employés at various weekly rates of wages (excluding pieceworkers), and the average number of hours in the ordinary day of labor in the various states.

The employés as presented in Table 7 may be distributed into 3 groups. Group 1 comprises officers, firm members, and clerks; group 2 comprises all other employés receiving wages according to time; group 3 comprises all operatives paid by the "piece" or according to the quantity of production. The following statement shows the numerical proportion of each group in the whole body of employés and their relative share of the total wages:

CLASSES OF EMPLOYÉS.	Average number.	Percentage.	Total wages.	Percentage.
Total	45,987	100.00	$22,118,522	100.00
Officers, firm members, and clerks	1,095	2.38	1,232,561	5.57
Operatives, skilled and unskilled	32,461	70.59	11,856,538	53.61
Pieceworkers	12,431	27.03	9,029,423	40.82

The proportion of men, women, and children, respectively, of the whole number of employés is as follows:

CLASSES OF EMPLOYÉS.	Average number.	Percentage.
Total	45,987	100.00
Males above 16 years	37,117	80.71
Females above 15 years	1,927	4.19
Children	6,943	15.10

The schedule of inquiry called for a statement showing distinctive classes of employés according to their occupations and the rates paid in each occupation. In many of the reports from establishments having a large number of employés engaged in the same class of occupation the rates of wages vary materially in the same class and the rate reported is the average, so that in computing the general average for the respective classes the result is, to some extent, an average of average amounts, and is not therefore a true average. The same difficulty was encountered at the census of 1880, and the following remarks relating to the subject contained in the report for the Tenth Census are equally applicable now:

> However, an endeavor has been made in the accompanying tables to arrive, as nearly as may be, at the range of wages paid the different classes of labor and the average wages; and if it is distinctly understood that this is only approximate, and does not claim to be the exact average wages of the different classes, no one need be led astray by the statement.

Table 8 shows the range and average rates of daily wages of employés classified by occupations in the various branches of glass manufacture as compiled from the reports of the different establishments.

The statement on the following page shows the intervals of payment prevailing in the different branches of the industry, as indicated by the returns received. In connection with the respective intervals is stated the number of establishments reporting and the number of employés paid by them at such intervals.

STATEMENT OF INTERVALS OF PAYMENT, GLASS MANUFACTURE: 1890.

BRANCHES.	WEEKLY.		FORTNIGHTLY.		MONTHLY.		NO STATEMENT.	
	Number of establishments.	Number of employés.	Number of establishments.	Number of employés.	Number of establishments.	Number of employés.	Number of establishments.	Number of employés.
Total	208	30,311	69	11,946	13	2,766	4	964
Plate glass	4	569	8	1,984	4	2,208	.....	.....
Window glass (*a*)	76	6,868	1	114	5	267	2	264
Glassware (*b*)	83	15,686	40	6,927	.....	.....	2	700
Green and black glass	45	7,188	20	2,921	4	291	.....	.....

a Thirty-one window glass works report weekly payments and monthly settlements and 1 with fortnightly settlements.
b Six glassware works report weekly payments with monthly settlements and 4 with fortnightly settlements.

There are factory stores connected with 1 plate glass works, 8 window glass works, 2 glassware works, and 9 green and black glass works.

TABLE 1.—DETAILED COMPARATIVE STATEMENT, GLASS

	STATES AND TERRITORIES.	Year.	Number of establishments reporting. (a)	Capital.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.					MATERIALS USED.						
					Aggregates.		Males above 16 years.	Females above 15 years.	Children.	Total cost.	Mixing sand. (Tons.)	Grinding sand. (Tons.)	Soda ash. (Tons.)	Salt cake. (Tons.)	Nitrate of soda. (Tons.)	Salt. (Tons.)
					Average number.	Total wages.										
1	The United States	1880	211	$19,844,699	24,177	$9,144,100	17,778	741	5,658	$8,028,021	155,447	39,500	49,626	7,877	2,859	1,909
		1890	317	41,581,598	45,987	22,118,522	37,117	1,927	6,943	12,140,985	369,328	227,416	96,777	38,092	7,031	2,429
2	Illinois	1880	7	445,000	732	342,027	632	.....	100	297,842	9,767	.....	2,495	648	.....	611
		1890	14	1,740,878	2,793	1,232,761	2,246	20	527	682,248	23,693	.....	7,324	2,143	592	598
3	Indiana	1880	4	1,442,000	862	284,207	695	53	114	433,733	7,124	32,300	2,854	.....	.....	83
		1890	21	3,556,563	3,089	1,544,831	2,700	209	180	865,374	31,821	50,000	7,608	4,694	263	10
4	Iowa	1880	3	57,000	35	2,000	24	2	9	3,248	25	.....	10	.....	2	.....
		1890	(b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	Kentucky	1880	5	795,000	522	150,322	364	11	147	134,104	3,543	.....	840	337	49	25
		c1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Maryland	1880	8	436,000	612	234,254	524	.....	88	239,682	5,344	.....	1,902	36	36	40
		1890	11	871,111	1,413	708,736	1,061	24	328	295,337	12,703	.....	2,558	112	230	25
7	Massachusetts	1880	11	823,000	946	383,342	828	58	60	329,864	2,205	.....	392	255	75	.....
		1890	7	390,051	514	219,427	473	19	22	127,180	1,920	.....	386	157	16	.....
8	Missouri	1880	6	1,430,000	965	381,098	709	36	220	351,871	8,042	7,200	3,071	.....	31	233
		1890	6	2,216,353	1,152	596,239	1,054	1	97	557,874	11,690	22,652	4,130	180	63	173
9	New Jersey	1880	27	2,728,021	3,578	1,300,038	2,762	46	770	1,088,346	26,282	.....	8,274	1,320	120	163
		1890	35	3,709,394	5,840	2,862,719	4,741	54	1,045	1,310,953	49,278	.....	16,644	1,542	263	90
10	New York	1880	32	1,933,000	3,078	1,046,812	2,116	50	912	944,691	16,122	.....	5,865	26	194	204
		1890	32	2,327,999	3,285	1,484,039	2,641	94	550	825,498	21,050	.....	6,444	2,116	232	105
11	Ohio	1880	20	1,194,350	1,688	644,520	1,170	81	437	459,333	10,008	.....	3,244	233	332	101
		1890	67	4,312,625	6,651	3,131,578	5,258	549	844	1,602,599	54,406	.....	12,894	6,607	1,628	127
12	Pennsylvania	1880	78	7,639,706	9,784	3,897,306	6,999	294	2,491	3,350,660	61,452	.....	18,419	4,822	1,841	392
		1890	102	20,596,049	18,934	9,247,160	15,244	753	2,937	5,294,992	149,239	154,764	34,287	20,251	3,277	649
13	West Virginia	1880	4	550,522	946	311,650	615	100	231	208,064	3,183	.....	1,315	.....	179	.....
		1890	7	825,313	1,405	558,025	1,004	190	211	277,033	5,350	.....	2,209	.....	416	.....
14	All other states	d1880	6	370,000	429	166,524	340	10	79	187,183	2,350	.....	945	200	.....	57
		c1890	15	975,262	911	533,007	695	14	202	301,897	8,178	.....	2,293	290	51	652

a Includes idle establishments for 1880 and 1890 and those reported as building at 1880.
b None reported in 1890.

MANUFACTURE, BY STATES AND TERRITORIES: 1880 AND 1890.

MATERIALS USED—continued.

Pearlash. (Pounds.)	Litharge. (Pounds.)	Lime and quicklime. (Bushels.)	Limestone. (Tons.)	Arsenic. (Pounds.)	Manganese. (Lbs.)	Fuel.			Pots. (Number.)	Fire clay and pot clay.				Lumber. (Number of M feet.)	Nails. (Kegs.)	
						Coal. (Tons.)	Wood. (Cords.)	Coke. (Tons.)		Total. (Pounds.)	American. (Pounds.)	English. (Pounds.)	German. (Pounds.)			
592,932	2,313,203	869,886	2,597	713,974	191,146	646,898	63,867	28,410	13,655	17,233,891	9,196,655	110,000	7,927,236	53,585	15,150	1
2,544,978	5,501,559	929,706	45,482	1,823,007	610,915	723,521	57,857	37,467	8,006	37,066,652	23,353,857	1,128,881	12,583,914	102,932	30,202	
.....	.....	49,607	300	26,100	.....	35,242	4,212	400	627	833,000	817,000	.....	16,000	2,012	544	2
.....	40,000	25,525	3,387	121,308	14,336	88,576	1,062	9,233	498	859,332	799,332	.....	60,000	4,389	1,860	
.....	.....	47,842	.....	32,000	.....	61,050	460	71	1,100	692,000	662,000	.....	30,000	1,767	1,040	3
.....	.....	61,818	6,877	214,100	87,052	69,425	500	280	701	3,153,600	2,235,600	.....	918,000	11,752	3,552	
.....	.....	650	.....	.....	400	400	.....	40	1	37,500	37,500	.....	.....	18	10	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
20,000	7,000	10,300	12	302	1,600	12,829	60	982	202	166,000	165,000	.....	1,000	1,115	690	5
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
.....	.....	62,865	.....	2,710	1,500	15,723	1,848	.....	587	692,000	68,000	.....	624,000	2,210	593	6
77,000	94,000	87,698	.....	16,520	14,600	30,248	2,726	1,110	363	2,487,620	765,420	38,000	1,684,200	2,433	1,272	
130,111	298,260	2,348	346	6,697	9,049	10,899	1,184	1,017	150	466,479	253,679	60,000	152,800	301	148	7
74,300	140,750	20	390	4,275	8,150	11,007	900	400	45	330,738	18,000	.....	312,738	1,549	102	
.....	.....	47,275	360	24,000	3,960	36,070	3,203	781	601	951,350	951,350	.....	.....	1,154	512	8
.....	.....	12,916	2,278	104,811	56,022	71,750	510	17,710	98	2,210,091	2,183,211	.....	26,880	2,021	777	
100	20,000	174,080	455	38,453	12,000	61,530	29,144	.....	2,118	2,880,998	629,000	.....	2,251,998	10,529	3,596	9
34,035	39,873	198,086	3,397	75,256	17,065	105,067	18,217	2,412	518	3,841,290	1,868,290	299,000	1,683,000	16,923	5,312	
142,456	559,257	98,854	.....	6,600	27,595	52,266	11,247	2,484	1,061	1,837,050	242,000	.....	1,595,050	5,201	1,098	10
500,334	1,213,264	90,502	778	52,026	32,489	70,853	24,485	2,880	450	2,775,355	925,725	392,848	1,456,782	6,966	3,103	
28,000	210,000	45,635	.....	28,916	16,436	54,945	1,488	3,935	835	848,025	700,425	.....	147,600	3,098	670	11
335,216	786,991	108,597	6,932	375,196	124,581	127,732	1,065	890	1,780	7,141,278	4,847,564	200,000	2,093,714	14,691	4,404	
268,496	1,218,686	309,122	1,124	547,266	110,178	278,575	8,996	16,277	5,170	6,495,169	3,541,981	26,000	2,927,188	24,834	5,062	12
1,474,093	3,086,681	208,674	20,248	746,393	216,910	122,771	6,082	1,580	3,223	13,086,298	8,931,215	208,033	3,947,050	39,202	8,946	
3,769	.....	7,533	.....	.....	8,518	19,319	.....	1,923	332	933,720	933,720	.....	.....	838	452	13
50,000	100,000	14,107	.....	89,822	16,450	3,160	.....	500	170	662,550	595,000	.....	67,550	1,441	429	
.....	.....	13,175	.....	930	.....	8,050	2,025	500	271	400,000	195,000	24,000	181,000	508	135	14
.....	.....	61,763	1,195	23,300	23,260	22,932	2,310	472	166	518,500	184,500	.....	334,000	1,565	355	

c Embraces establishments distributed as follows: California, 1; Colorado, 2; Delaware, 1; Georgia, 2; Kansas, 1; Kentucky, 4; Michigan, 1; Minnesota, 1; Utah, 1; Wisconsin, 1.

d Embraces establishments distributed as follows: California, 1; Connecticut, 1; District of Columbia, 1; Michigan, 1; Mississippi, 1; New Hampshire, 1.

TABLE 1.—DETAILED COMPARATIVE STATEMENT, GLASS

	STATES AND TERRITORIES.	Year.	MATERIALS USED—continued.		PRODUCTS.								
						Plate glass.				Window glass.		Glassware.	Green and black glass.
			Straw and hay. (Tons.)	Casks and barrels. (Number.)	Total value. (a)	Value.	Total cast. (Square feet.)	Sold rough. (Square feet.)	Polished. (Square feet.)	Value.	Boxes.	Value.	Value.
1	The United States	1880	21,298	914,619	$21,154,571	$868,305	1,700,227	377,227	1,042,000	$5,047,313	1,804,734	$9,568,520	$5,670,433
		1890	37,253	1,601,071	41,051,004	4,869,494	19,319,509	3,106,831	9,100,111	9,058,802	3,768,884	18,601,244	8,521,464
2	Illinois	1880	941	4,500	901,343	.....	.....	.....	.....	373,343	115,271	.....	528,000
		1890	1,566	14,090	2,372,011	.....	.....	.....	.....	.....	.....	949,883	905,907
3	Indiana	1880	467	.....	790,781	496,400	970,000	130,000	642,000	229,397	91,759	.....	64,984
		1890	2,712	3,000	2,995,409	946,000	2,383,793	100,000	1,758,248	885,745	360,114	672,179	491,485
4	Iowa	1880	1	800	3,500	.....	.....	.....	.....	.....	.....	3,500	.....
		1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	Kentucky	1880	1,155	400	388,405	3,512	20,684	20,684	.....	.....	.....	215,330	169,563
		1890	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Maryland	1880	409	1,200	587,000	.....	.....	.....	.....	332,000	141,000	85,000	170,000
		1890	802	39,963	1,256,697	.....	.....	.....	.....	.....	.....	674,900	.....
7	Massachusetts	1880	325	53,475	854,345	45,843	209,543	209,543	.....	104,002	41,866	704,500	.....
		1890	233	3,000	431,437	72,748	569,375	434,150	.....	.....	.....	.....	.....
8	Missouri	1880	617	1,500	919,827	322,550	500,000	17,000	400,000	68,000	24,000	136,487	392,790
		1890	480	840	1,215,329	.....	.....	.....	.....	.....	.....	.....	.....
9	New Jersey	1880	3,002	31,000	2,810,170	.....	.....	.....	.....	720,155	296,685	400,000	1,681,015
		1890	4,131	600	5,218,152	.....	.....	.....	.....	1,316,170	622,432	1,235,426	2,666,556
10	New York	1880	2,328	147,977	2,420,796	.....	.....	.....	.....	540,903	216,748	1,157,571	722,322
		1890	1,990	140,315	2,723,019	.....	.....	.....	.....	.....	.....	1,307,156	693,680
11	Ohio	1880	1,375	86,835	1,549,320	.....	.....	.....	.....	358,000	127,122	1,076,320	115,000
		1890	6,543	376,636	5,049,182	.....	.....	.....	.....	.....	.....	3,554,370	519,015
12	Pennsylvania	1880	9,787	516,520	8,720,584	.....	.....	.....	.....	2,222,513	780,283	4,881,312	1,616,759
		1890	16,978	985,327	17,179,137	2,758,347	9,024,273	515,177	5,849,519	3,648,577	1,430,455	8,700,124	2,072,039
13	West Virginia	1880	754	70,312	748,500	.....	.....	.....	.....	.....	.....	748,500	.....
		1890	1,392	119,800	945,234	.....	.....	.....	.....	.....	.....	945,234	.....
14	All other states	1880	137	100	460,000	.....	.....	.....	.....	90,000	30,000	160,000	210,000
		1890	426	7,500	1,065,397	1,092,399	7,342,068	2,057,504	1,492,344	3,208,310	1,355,883	561,972	1,082,726

a While the total value for the respective states is the total value of products reported for all branches of the glass manufacture, this total can not be obtained by adding the amounts given. To avoid disclosing the operations of individual establishments it is necessary to suppress the totals for window glass in all the states except Indiana, New Jersey, and Pennsylvania; also totals for other branches of the industry in states for which less than 3 establishments are reported.

MANUFACTURE, BY STATES AND TERRITORIES: 1880 AND 1890—Continued.

EQUIPMENT OF PLANT (NUMBER). (b)																					
Furnaces.	Pots.	Casting tables.	Annealing ovens.	Grinding machines.	Smoothing machines.	Polishing machines.	Clay grinding mills.	Flattening ovens.	Monkey ovens.	Glory holes.	Presses or pressing machines.	Leers.	Shops.	Crimping machines.	Finishing machines.	Grinding and engraving machines.	Horses.	Mules.	Wagons.	Carts.	Drays.	
348	2,982	16	1,704	70	44	70	171	68	16	437	522	.....	1,353	.....	.....	716	518	231	407	187	85	1
593	5,171	63	2,220	191	28	214	156	138	19	903	804	611	2,953	233	91	816	545	48	88	211	189	
12	110	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
28	233	6	269	4	.....	.....	4	8	.....	52	2	11	125	.....	.....	1	25	.....	1	6	6	2
10	108	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
48	449	8	217	43	21	50	9	13	2	32	8	43	77	.....	.....	4	23	6	6	16	5	3
3	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
7	55	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
10	76	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
19	161	.....	34	3	.....	.....	6	4	.....	23	4	23	148	15	50	17	21	.....	5	8	8	6
22	206	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
15	103	6	25	.....	.....	.....	2	1	.....	7	9	8	33	.....	.....	85	11	.....	2	8	1	7
9	75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
14	158	23	120	26	.....	50	8	1	.....	2	.....	2	30	.....	.....	1	16	15	13	7	5	8
56	377	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
82	487	.....	352	12	.....	.....	22	22	1	199	17	50	323	.....	.....	47	122	.....	12	47	48	9
48	373	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
57	418	2	121	8	.....	.....	26	14	6	41	30	47	247	.....	.....	23	66	2	1	32	34	10
29	277	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
97	897	2	163	16	.....	.....	21	27	1	145	246	150	472	57	21	274	32	.....	3	18	13	11
127	1,168	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
199	2,006	16	788	73	7	114	48	45	9	370	403	241	1,316	151	20	303	189	24	42	54	51	12
8	82	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
17	144	.....	18	2	.....	.....	3	.....	.....	24	85	33	104	10	.....	60	12	.....	3	5	4	13
7	47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
17	115	.....	113	4	.....	.....	7	3	.....	8	.....	3	78	.....	.....	1	28	1	.....	10	14	14

b The equipment of glass manufacturing plants other than furnaces and pots not having been reported by state totals in 1880, the comparison can be made only for the United States.

TABLE 2.—DETAILED STATEMENT, GLASS

	STATES.	Number of establishments reporting.	CAPITAL.							
			Aggregate.	Value of plant.				Live assets.			
				Total.	Land.	Buildings.	Machinery, tools, and implements.	Total.	Raw materials.	Stock in process and finished products on hand.	Cash, bills and accounts receivable, and all sundries not elsewhere reported.
1	The United States	294	$40,966,850	$25,437,450	$5,097,726	$11,401,021	$8,938,703	$15,529,400	$2,159,860	$6,339,196	$7,030,344
2	Illinois	13	1,721,878	1,025,171	213,900	637,334	173,937	696,707	186,287	159,022	351,398
3	Indiana	21	3,556,563	2,625,300	195,000	879,794	1,550,506	931,263	173,020	417,290	340,953
4	Maryland	11	871,111	527,192	142,000	296,692	88,500	343,919	74,561	259,358	10,000
5	Massachusetts	6	365,051	185,000	33,000	99,000	53,000	180,051	24,485	97,560	58,006
6	Missouri	5	2,201,353	1,641,159	164,159	858,000	619,000	560,194	94,950	211,519	253,725
7	New Jersey	34	3,744,894	1,858,200	239,000	1,168,200	451,000	1,886,694	250,988	737,204	898,502
8	New York	30	2,297,699	1,243,709	261,800	724,000	257,909	1,053,999	139,629	418,979	495,391
9	Ohio	59	4,094,077	2,267,212	281,522	1,369,696	615,994	1,827,465	186,872	858,627	781,966
10	Pennsylvania	99	20,459,049	13,167,174	3,377,345	4,933,615	4,856,214	7,291,875	925,989	2,901,111	3,464,775
11	West Virginia	7	825,313	377,757	33,000	213,000	131,757	447,556	36,319	144,652	266,585
12	All other states (a)	9	829,202	519,585	157,000	221,690	140,895	309,677	60,760	133,874	109,043

	STATES.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—continued.											
		Operatives, skilled and unskilled.						Piecework.					
		Males above 16 years.		Females above 15 years.		Children.		Males above 16 years.		Females above 15 years.		Children.	
		Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
1	The United States	24,337	$10,664,728	1,026	$273,064	6,498	$918,746	11,727	$8,881,623	259	$59,181	445	$88,619
2	Illinois	1,547	628,981	20	3,860	524	62,235	668	492,545	.....	.....	3	430
3	Indiana	1,719	631,306	135	14,611	180	19,234	914	790,798	62	13,200	.....	.....
4	Maryland	554	145,902	24	6,864	286	33,369	491	505,019	.....	.....	42	5,406
5	Massachusetts	352	143,341	19	3,732	12	1,500	103	51,880	.....	.....	10	1,200
6	Missouri	866	411,492	.....	.....	97	17,784	159	112,881	.....	.....	.....	.....
7	New Jersey	2,664	1,023,503	40	8,245	1,026	114,397	1,937	1,582,295	2	160	10	1,500
8	New York	2,170	1,053,740	62	11,880	481	74,206	417	265,867	30	5,145	69	11,788
9	Ohio	3,709	1,738,097	526	71,711	824	121,992	1,344	961,039	12	2,516	20	5,000
10	Pennsylvania	10,021	4,537,074	659	127,365	2,676	422,502	4,803	3,553,852	90	27,324	261	60,403
11	West Virginia	334	140,289	127	21,796	190	29,206	636	306,060	63	10,836	21	2,892
12	All other states	401	211,003	14	3,000	202	22,321	264	258,487	.....	.....	.....	.....

	STATES.	MATERIALS USED—continued.									
		Pearlash.		Litharge (or red lead).		Lime.		Quicklime.		Limestone.	
		Pounds.	Cost.	Pounds.	Cost.	Bushels.	Cost.	Bushels.	Cost.	Tons.	Cost.
1	The United States	2,544,978	$135,047	5,501,559	$300,096	825,297	$136,615	104,469	$13,477	45,482	$136,450
2	Illinois	.....	.....	40,000	2,400	25,525	3,960	.....	.....	3,387	13,122
3	Indiana	.....	.....	.....	.....	59,603	7,193	2,215	435	6,877	16,397
4	Maryland	77,000	3,550	94,000	4,975	36,857	1,872	50,841	2,596	.....	.....
5	Massachusetts	74,300	4,458	140,750	8,445	.....	.....	20	6	390	937
6	Missouri	.....	.....	.....	.....	12,916	2,495	.....	.....	2,278	5,460
7	New Jersey	34,035	1,817	39,873	2,118	191,086	31,485	7,000	1,500	3,397	13,648
8	New York	500,334	27,237	1,213,264	73,049	66,062	16,560	24,440	4,887	778	1,824
9	Ohio	335,216	16,985	786,991	35,810	105,040	16,708	3,557	356	6,932	16,534
10	Pennsylvania	1,474,093	77,440	3,086,681	167,499	252,278	42,744	16,396	3,097	20,248	66,360
11	West Virginia	50,000	3,500	100,000	5,800	14,107	3,237	.....	.....	.....	.....
12	All other states	.....	.....	.....	.....	61,763	10,361	.....	.....	1,195	2,168

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1.

MANUFACTURE, BY STATES: 1890.

MISCELLANEOUS EXPENSES.							AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.						
							Aggregates.		Officers, firm members, and clerks.				
									Males above 16 years.		Females above 15 years.		
Total.	Rent paid for tenancy.	Taxes.	Insurance.	Repairs, ordinary, of buildings and machinery.	Interest paid on cash used in the business.	All sundries not elsewhere reported.	Average number.	Total wages.	Number.	Wages.	Number.	Wages.	
$2,267,696	$70,265	$177,578	$287,850	$350,810	$412,321	$968,872	45,987	$22,118,522	1,053	$1,217,202	42	$15,359	1
134,625	.....	5,847	12,275	29,802	12,193	74,508	2,793	1,232,761	31	44,710	.....	.....	2
360,384	.....	13,637	20,915	86,302	36,230	209,300	3,089	1,544,831	67	69,680	12	6,002	3
35,847	.....	9,193	9,832	6,041	6,886	3,895	1,413	708,736	16	12,176	.....	.....	4
35,760	.....	2,811	2,560	4,309	3,970	22,110	514	219,427	18	17,774	.....	.....	5
116,397	.....	5,812	14,204	12,005	48,676	35,700	1,152	596,239	38	53,811	1	271	6
116,009	6,650	18,526	21,102	27,200	26,346	16,185	5,840	2,802,719	140	129,213	12	3,406	7
167,900	31,400	11,743	17,758	17,829	25,631	63,539	3,285	1,484,039	54	60,821	2	592	8
294,744	700	20,355	48,523	31,939	65,587	127,640	6,651	3,131,578	205	226,985	11	3,338	9
911,178	28,390	80,855	130,370	116,489	174,805	380,269	18,934	9,247,160	420	516,890	4	1,750	10
40,805	.....	4,301	4,536	8,950	1,650	21,368	1,405	558,025	34	46,946	.....	.....	11
54,047	3,125	4,408	5,775	9,944	16,347	14,358	911	533,007	30	38,196	.....	.....	12

MATERIALS USED.													
Aggregate cost.	Mixing sand.		Grinding sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Nitrate of soda.		Salt (chloride of sodium).		
	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	
$12,140,985	369,328	$809,998	227,416	$151,995	96,777	$3,108,233	38,092	$604,179	7,031	$278,291	2,429	$12,904	1
682,248	23,693	36,740	.....	.....	7,324	235,948	2,143	19,807	592	19,110	598	3,032	2
865,374	31,821	80,135	50,000	20,000	7,608	233,894	4,694	64,291	263	10,190	10	60	3
295,337	12,703	30,577	.....	.....	2,558	63,958	112	3,278	230	8,371	25	188	4
127,180	1,920	6,703	.....	.....	386	12,401	157	4,710	16	900	.....	.....	5
557,874	11,690	12,445	22,052	11,326	4,130	156,227	180	2,161	63	2,825	173	1,004	6
1,310,953	49,278	77,740	.....	.....	16,644	498,812	1,542	28,376	263	11,189	90	868	7
825,498	21,050	51,378	.....	.....	6,444	176,281	2,116	25,491	232	10,797	105	445	8
1,602,599	54,406	141,714	.....	.....	12,894	467,032	6,607	110,255	1,628	59,021	127	661	9
5,294,992	149,239	424,849	154,764	120,669	34,287	1,164,339	20,251	346,526	3,277	138,658	649	5,321	10
277,033	5,350	20,845	.....	.....	2,209	77,725	.....	.....	416	15,140	.....	.....	11
301,897	8,178	16,872	.....	.....	2,293	81,616	200	4,284	51	2,000	652	1,325	12

MATERIALS USED—continued.												
Arsenic.		Manganese.		Rouge.		Fuel.						
						Total cost.	Natural gas.	Coal.		Coke.		
Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.		Cost.	Tons.	Cost.	Tons.	Cost.	
1,823,007	$61,575	610,915	$31,080	1,116,669	$64,390	$2,340,912	$780,308	723,521	$1,296,482	37,467	$59,917	1
121,308	4,209	14,336	872	.....	.....	146,834	.....	88,576	99,198	9,233	21,596	2
214,100	7,357	87,052	4,179	150,000	7,350	89,866	200	69,425	87,016	280	1,400	3
16,520	470	14,600	765	.....	.....	29,145	.....	30,248	78,112	1,110	3,142	4
4,275	131	8,150	408	.....	.....	44,691	.....	11,007	32,946	400	1,325	5
104,811	3,726	56,022	2,241	288,000	2,016	157,928	.....	71,750	154,413	17,710	2,092	6
75,256	1,979	17,065	785	.....	.....	384,951	.....	105,067	306,373	2,412	9,283	7
52,026	1,623	32,489	1,615	.....	.....	244,893	.....	70,853	203,732	2,880	11,195	8
375,196	12,937	124,581	6,577	38,000	2,870	156,404	91,063	127,732	57,189	890	1,030	9
746,393	25,780	216,910	11,932	640,669	52,154	858,281	635,135	122,771	198,841	1,580	3,969	10
89,822	2,606	16,450	985	.....	.....	54,885	51,000	8,160	2,085	500	1,800	11
23,300	757	23,200	721	.....	.....	113,034	.....	22,932	76,577	472	3,085	12

TABLE 2.—DETAILED STATEMENT, GLASS

	STATES.	MATERIALS USED—continued.							
		Fuel—Continued.				Fire clay and pot clay.			
		Wood.		Petroleum.		Total.		American.	
		Cords.	Cost.	Barrels.	Cost.	Pounds.	Cost.	Pounds.	Cost.
1	The United States	57,857	$140,926	38,660	$63,189	37,066,652	$328,903	23,353,857	$208,037
2	Illinois	1,062	2,740	11,716	23,300	859,332	7,125	799,332	6,229
3	Indiana	500	1,250			3,153,600	27,725	2,235,600	17,420
4	Maryland	2,726	7,891			2,487,620	17,164	765,420	6,314
5	Massachusetts	900	2,420	4,000	8,000	330,738	3,927	18,000	338
6	Missouri	510	1,423			2,210,091	15,232	2,183,211	15,031
7	New Jersey	18,217	67,945	1,125	2,250	3,841,290	39,554	1,808,290	14,800
8	New York	24,485	27,302	1,332	2,664	2,775,355	20,989	925,725	5,314
9	Ohio	1,065	2,547	787	1,575	7,141,278	49,072	4,847,564	32,711
10	Pennsylvania	6,082	18,686	1,100	1,650	13,086,298	139,571	8,931,215	105,481
11	West Virginia					602,550	3,245	595,000	2,745
12	All other states	2,310	9,022	18,600	23,750	518,500	4,699	184,500	1,654

	STATES.	VALUE OF PRODUCTS.					EQUIPMENT OF PLANT (NUMBER).					
		Total. (a)	Plate glass.	Window glass.	Glassware.	Green and black glass.	Furnaces.	Pots.	Casting tables.	Annealing ovens.	Grinding machines.	Smoothing machines.
1	The United States	$41,051,004	$4,869,494	$9,658,862	$18,601,244	$8,521,404	564	4,932	62	2,142	186	28
2	Illinois	2,372,011			949,883	995,907	27	225	6	269	4	
3	Indiana	2,995,409	946,000	885,745	672,179	491,485	48	449	8	217	43	21
4	Maryland	1,256,697			674,900		19	161		34	3	
5	Massachusetts	431,437	72,748				11	69	6	25		
6	Missouri	1,215,329					13	148	23	117	26	
7	New Jersey	5,218,152		1,316,170	1,235,426	2,666,556	80	469		352	12	
8	New York	2,723,019			1,307,156	693,686	55	400	2	105	7	
9	Ohio	5,649,182			3,554,370	519,015	85	806	1	123	13	
10	Pennsylvania	17,179,137	2,758,347	3,648,577	8,700,124	2,072,089	197	1,982	16	788	73	7
11	West Virginia	945,234			945,234		17	144		18	2	
12	All other states	1,065,397	1,092,399	3,208,310	561,972	1,082,726	12	79		94	3	

a While the total value for the respective states is the total value of products reported for all branches of glass manufacture, this total can not be obtained by adding the amounts given. To avoid disclosing the operations of individual establishments it is necessary to suppress the totals for window glass in all the states except Indiana, New Jersey, and Pennsylvania; also totals for other branches of the industry in states for which less than 3 establishments are reported.

MANUFACTURE, BY STATES: 1890—Continued.

MATERIALS USED—continued.

Fire clay and pot clay—Continued.				Pots, not including those made at works.		Total cost of lumber, nails, straw, hay, casks, and barrels.	Lumber, including that in boxes purchased.	Nails.	Straw and hay.	Casks and barrels.	All other materials.	
English.		German.										
Pounds.	Cost.	Pounds.	Cost.	Number.	Cost.		Cost.	Cost.	Cost.	Cost.	Cost.	
1,128,881	$11,651	12,583,914	$109,215	8,000	$393,875	$1,853,462	$1,080,937	$82,837	$274,941	$414,747	$1,289,593	1
.....	.....	60,000	896	498	31,948	78,324	62,025	4,604	7,855	3,840	78,817	2
.....	.....	918,000	10,305	701	30,055	174,827	147,899	9,656	16,272	1,000	91,420	3
38,000	338	1,684,200	10,512	363	15,275	37,220	19,048	3,310	6,070	8,792	15,933	4
.....	.....	312,738	3,589	45	1,328	19,797	13,266	681	2,350	3,500	18,248	5
.....	.....	26,880	201	98	4,740	30,957	26,187	2,093	2,589	88	147,091	6
200,000	3,857	1,683,000	20,897	518	16,724	150,530	112,260	13,711	24,414	145	53,817	7
392,848	4,082	1,456,782	11,593	450	6,905	123,681	68,394	9,129	15,138	31,020	37,843	8
200,000	1,000	2,093,714	15,961	1,780	91,884	317,906	152,811	12,523	44,773	107,799	159,273	9
208,033	2,374	3,947,050	31,716	3,223	175,444	837,633	444,240	24,455	140,045	228,893	636,095	10
.....	.....	67,550	500	170	12,222	56,400	16,230	1,300	11,200	27,670	20,443	11
.....	.....	334,000	3,045	160	7,350	26,187	18,577	1,375	4,235	2,000	30,523	12

EQUIPMENT OF PLANT (NUMBER)—continued.

Polishing machines.	Clay-grinding mills.	Flattening ovens.	Monkey ovens.	Glory holes.	Presses or pressing machines.	Leers.	Shops.	Crimping machines.	Finishing machines.	Grinding and engraving machines.	Horses.	Mules.	Wagons.	Carts.	Drays.	Cost of new construction.	
214	153	135	19	880	801	599	2,894	233	91	798	542	48	88	209	187	$606,958	1
.....	4	8	.....	48	2	11	115	.....	.....	1	25	.....	1	6	6	27,088	2
50	9	13	2	32	3	13	77	.....	.....	4	23	6	6	16	5	9,500	3
.....	6	4	.....	23	4	23	148	15	50	17	21	.....	5	8	8	12,000	4
.....	2	1	.....	7	9	8	33	.....	.....	85	11	.....	2	3	1	20,600	5
50	7	1	.....	.....	.....	.....	23	.....	.....	.....	15	15	13	7	4	81,000	6
.....	22	22	1	199	17	60	323	.....	.....	47	122	.....	12	47	48	43,750	7
.....	25	14	6	41	30	47	236	.....	.....	23	65	2	1	31	33	10,250	8
.....	21	25	1	130	243	142	441	57	21	258	31	.....	3	17	13	20,150	9
114	48	45	9	370	403	241	1,316	151	20	303	189	24	42	54	51	371,111	10
.....	3	.....	.....	24	85	33	104	10	.....	60	12	.....	3	5	4	3,850	11
.....	6	2	.....	6	.....	1	78	.....	.....	.....	28	1	.....	10	14	7,650	12

TABLE 3.—DETAILED STATEMENT,

	STATES.	Number of establishments reporting.	CAPITAL.							
			Aggregate.	Value of plant.				Live assets.			
				Total.	Land.	Buildings.	Machinery, tools, and implements.	Total.	Raw materials.	Stock in process and finished products on hand.	Cash, bills and accounts receivable, and all sundries not elsewhere reported.
1	The United States	16	$10,233,641	$8,202,893	$595,559	$2,811,000	$4,796,334	$2,030,748	$347,620	$824,661	$858,467
2	Indiana	3	2,174,000	1,819,000	61,000	481,000	1,277,000	355,000	60,000	173,000	122,000
3	Massachusetts	3	58,750	42,000	8,000	24,000	10,000	16,750	2,750	11,000	3,000
4	Pennsylvania	4	5,962,643	4,785,334	406,000	1,500,000	2,879,334	1,176,809	196,970	491,212	488,627
5	All other states (a)	6	2,038,248	1,556,059	120,559	806,000	629,500	482,189	87,900	149,449	244,840

	STATES.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—continued.													
		Operatives and skilled—Cont'd.				Unskilled.				Piecework ers.					
		Females above 15 years.		Children.		Males above 16 years.		Females above 15 years.		Children.		Males above 16 years.		Females above 15 years.		Children.	
		Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
1	The United States	50	$14,733	66	$11,808	1,246	$465,832	5	$660	14	$1,478	312	$217,349	12	$5,200	3	$430
2	Indiana	.....	.....	.....	.....	361	120,706	5	660	14	1,478	111	87,750	12	5,200	.....	.....
3	Massachusetts	.....	.....	.....	.....	58	15,994	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	Pennsylvania	50	14,733	18	4,320	514	220,256	.....	.....	.....	.....	90	66,379	.....	.....	.....	.....
5	All other states	.....	.....	48	7,488	313	99,882	.....	.....	.....	.....	111	63,220	.....	.....	3	430

	STATES.	MATERIALS USED—continued.											
		Manganese.		Rouge.		Fuel.							
						Total cost.	Natural gas.	Coal.		Coke.		Wood.	
		Pounds.	Cost.	Pounds.	Cost.		Cost.	Tons.	Cost.	Tons.	Cost.	Cords.	Cost.
1	The United States	104,822	$4,345	1,116,669	$64,390	$306,443	$85,795	118,074	$214,201	250	$1,000	2,603	$5,447
2	Indiana	42,000	1,760	150,000	7,350	63,570	.....	50,010	62,570	.....	.....	400	1,000
3	Massachusetts	5,000	250	.....	.....	13,483	.....	4,023	10,500	250	1,000	775	1,983
4	Pennsylvania	.....	.....	640,669	52,154	85,795	85,795	.....	.....	.....	.....	.....	.....
5	All other states	57,822	2,335	326,000	4,886	143,595	.....	63,981	141,131	.....	.....	1,428	2,464

	STATES.	PRODUCTS.								
		Total value.	Total cast.	Sold rough.		Polished.		Cathedral glass.		All other products.
			Square feet.	Square feet.	Value.	Square feet.	Value.	Square feet.	Value.	Value.
1	The United States	$4,869,494	19,319,509	3,106,831	$337,057	9,100,111	$4,172,484	2,773,824	$279,407	$80,546
2	Indiana	946,000	2,383,793	100,000	20,000	1,758,248	886,000	.....	.....	40,000
3	Massachusetts	72,748	599,375	434,150	59,025	.....	.....	.....	.....	13,723
4	Pennsylvania	2,758,317	9,024,273	515,177	82,232	5,849,519	2,676,115	.....	.....	.....
5	All other states	1,092,399	7,342,068	2,057,504	175,800	1,492,344	610,369	2,773,824	279,407	26,823

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Illinois, 2; Missouri, 2; New York, 1; Ohio, 1.

PLATE GLASS, BY STATES: 1890.

MISCELLANEOUS EXPENSES.						AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.										
Total.	Taxes.	Insurance.	Repairs, ordinary, of buildings and machinery.	Interest paid on cash used in the business.	All sundries not elsewhere reported.	Aggregates.		Officers or firm members actively engaged in the industry or in supervision.		Clerks.				Operatives and skilled.		
						Average number.	Total wages.	Males above 16 years.		Males above 16 years.		Females above 15 years.		Males above 16 years.		
								Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	
$510,238	$23,502	$39,368	$43,500	$132,683	$271,185	4,761	$2,417,141	33	$104,600	79	$60,573	16	$5,031	2,931	$1,529,447	1
174,600	5,550	6,800	32,250	500	129,500	786	405,388	8	14,000	13	7,440	8	4,160	254	164,000	2
2,112	650	512	950	.....	.....	87	27,852	.....	.....	3	1,250	.....	.....	26	10,608	3
222,949	13,016	18,808	500	86,950	103,585	2,839	1,466,503	12	54,500	36	33,342	1	600	2,118	1,063,373	4
110,577	4,286	13,158	9,860	45,233	38,100	1,049	517,398	13	36,100	27	18,541	1	271	533	291,466	5

MATERIALS USED.																
Aggregate cost.	Mixing sand.		Grinding sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Nitrate of soda.		Quicklime.		Limestone.		Arsenic.	
	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Bushels.	Cost.	Tons.	Cost.	Pounds.	Cost.
$1,894,630	49,487	$137,694	227,416	$151,995	10,658	$378,901	6,006	$102,694	76	$3,605	2,520	$456	14,571	$39,976	470,936	$15,734	1
297,167	7,730	19,785	50,000	20,000	1,300	42,400	1,590	27,030	.....	.....	2,000	400	2,695	5,885	89,000	2,807	2
32,921	958	2,626	.....	.....	210	6,560	157	4,710	.....	.....	20	16	195	450	2,000	60	3
1,048,555	30,875	104,437	154,764	120,669	5,615	202,040	4,229	70,593	.....	.....	.....	.....	9,333	27,849	296,533	9,890	4
515,987	9,924	10,846	22,652	11,326	3,533	127,901	30	301	76	3,605	500	50	2,348	5,792	83,403	2,977	5

MATERIALS USED—continued.																		
Fire clay and pot clay.								Pots, not including those made at works.		Total cost of lumber, nails, straw, and hay.	Lumber, including that in boxes purchased.		Nails.		Straw and hay.		All other materials.	
Total.		American.		English.		German.												
Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Number.	Cost.		Number of M feet.	Cost.	Kegs.	Cost.	Tons.	Cost.	Cost.	
5,086,576	$62,577	4,903,364	$60,876	40,000	$492	143,212	$1,209	1,141	$37,300	$107,443	7,106	$87,976	3,621	$9,355	1,601	$10,112	$481,077	1
1,555,000	9,055	1,555,000	9,055	.....	.....	.....	.....	50	1,000	18,750	1,185	13,270	1,140	2,885	440	2,595	77,375	2
105,212	727	2,000	18	.....	.....	103,212	709	26	340	2,449	240	1,680	70	215	54	554	1,230	3
1,107,633	36,273	1,067,633	35,773	.....	.....	40,000	500	620	31,000	53,043	3,600	45,336	1,604	3,972	384	3,735	254,812	4
2,318,731	16,522	2,278,731	16,030	40,000	492	.....	.....	445	4,960	33,201	2,081	27,690	807	2,283	723	3,228	147,630	5

EQUIPMENT OF PLANT (NUMBER).														
Furnaces.	Pots.	Casting tables.	Annealing ovens.	Smoothing machines.	Polishing machines.	Grinding machines.	Clay grinding mills.	Horses.	Mules.	Wagons.	Carts.	Drays.	Cost of new construction.	
49	725	62	542	28	214	123	16	44	23	26	27	7	$316,173	1
12	195	8	172	21	50	39	5	10	6	3	10	4	.....	2
6	22	6	21	.....	.....	.....	.....	3	.....	2	1	.....	.....	3
18	350	16	245	7	114	59	3	21	2	9	10	.....	225,173	4
13	158	32	104	.....	50	25	8	10	15	12	6	3	91,000	5

TABLE 4.—DETAILED STATEMENT,

	STATES.	Number of establishments reporting.	CAPITAL.							
			Aggregate.	Value of plant.				Live assets.			
				Total.	Land.	Buildings.	Machinery, tools, and implements.	Total.	Raw materials.	Stock in process and finished products on hand.	Cash, bills and accounts receivable, and all sundries not elsewhere reported.
1	The United States....	84	$8,119,935	$5,523,854	$1,812,700	$2,819,932	$891,222	$2,596,081	$453,376	$1,232,340	$910,365
2	Indiana	8	723,100	503,500	77,500	253,000	173,000	219,600	52,300	103,900	63,400
3	New Jersey	12	967,923	597,000	111,500	365,000	120,500	370,923	50,732	106,921	213,270
4	Pennsylvania	24	3,753,207	2,702,250	1,290,000	1,029,500	382,750	1,050,957	220,725	412,516	417,716
5	All other states (a)	40	2,675,705	1,721,104	333,700	1,172,432	214,972	954,601	129,619	609,003	215,979

	STATES.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—continued.											
		Operatives and skilled.				Unskilled.				Pieceworkers.			
		Males above 16 years.		Children.		Males above 16 years.		Children.		Males above 16 years.		Children.	
		Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
1	The United States....	2,478	$1,514,928	75	$23,020	1,845	$686,615	17	$2,204	2,821	$2,659,794	107	$26,405
2	Indiana	268	124,530	.....	.....	78	25,250	.....	.....	427	384,971	.....	.....
3	New Jersey	219	130,279	.....	.....	318	103,619	15	1,580	511	483,206	19	1,500
4	Pennsylvania	662	390,240	75	23,020	599	252,373	2	624	1,189	1,190,457	82	23,917
5	All other states	1,329	869,879	.....	.....	850	305,373	.....	.....	694	601,160	6	988

	STATES.	MATERIALS USED—continued.									
		Arsenic.		Manganese.		Fuel.					
						Total cost.	Natural gas.	Coal.		Coke.	
		Pounds.	Cost.	Pounds.	Cost.		Cost.	Tons.	Cost.	Tons.	Cost.
1	The United States....	621,686	$22,457	21,500	$990	$684,550	$242,479	296,502	$397,542	2,742	$11,011
2	Indiana	24,500	1,672	.....	.....	18,388	200	14,515	18,188	.....	.....
3	New Jersey	11,724	403	.....	.....	119,741	.....	33,581	101,198	2,070	7,936
4	Pennsylvania	285,746	9,773	4,500	190	289,459	212,795	67,643	74,125	168	336
5	All other states	299,716	10,609	17,000	800	256,962	29,484	180,763	204,031	504	2,739

	STATES.	MATERIALS USED—continued.							
		Total cost of lumber, nails, straw, and hay.	Lumber, including that in boxes purchased.		Nails.		Straw and hay.		All other materials.
			Number of M feet.	Cost.	Kegs.	Cost.	Tons.	Cost.	Cost.
1	The United States....	$448,920	40,525	$390,468	8,566	$24,359	4,326	$84,093	$233,982
2	Indiana	50,507	4,863	46,293	604	1,624	395	2,590	8,246
3	New Jersey	44,601	5,135	36,967	1,549	4,008	512	3,626	15,386
4	Pennsylvania	201,308	18,318	178,974	1,741	5,344	2,084	16,990	165,162
5	All other states	152,504	12,204	128,234	4,672	13,383	1,335	10,887	45,188

a Includes states grouped in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Delaware, 1; Illinois, 8; Maryland, 4; Massachusetts, 1; Michigan, 1; Missouri, 1; New York, 8; Ohio, 21. See description of Table 4 on page 316.

WINDOW GLASS, BY STATES: 1890.

MISCELLANEOUS EXPENSES.							AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.								
							Aggregates.		Officers or firm members actively engaged in the industry or in supervision.		Clerks.				
									Males above 16 years.		Males above 16 years.		Females above 15 years.		
Total.	Rent paid for tenancy.	Taxes.	Insurance.	Repairs, ordinary, of buildings and machinery.	Interest paid on cash used in the business.	All sundries not elsewhere reported.	Average number.	Total wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	
$559,307	$9,362	$51,227	$90,528	$90,765	$77,492	$239,927	7,513	$5,080,874	78	$95,747	86	$69,484	6	$2,677	1
122,527	.....	4,987	7,544	35,596	4,400	70,000	796	554,528	3	3,670	19	15,327	1	780	2
40,258	4,700	4,700	8,280	11,050	6,970	4,558	1,104	736,472	7	8,125	12	7,166	3	997	3
168,898	1,168	26,999	42,252	20,820	11,224	66,426	2,664	1,937,341	21	27,155	33	29,055	1	500	4
227,624	3,500	14,541	32,452	23,290	54,898	98,943	2,949	1,852,533	47	56,797	22	17,936	1	400	5

MATERIALS USED.														
Aggregate cost.	Mixing sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Salt (chloride of sodium).		Lime.		Quicklime.		Limestone.	
	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Bushels.	Cost.	Bushels.	Cost.	Tons.	Cost.
$2,726,905	108,305	$215,210	12,057	$339,197	29,618	$458,704	106	$353	10,563	$4,113	101,949	$13,021	24,341	$77,714	1
213,678	11,055	27,646	1,267	36,737	2,819	28,940	.....	.....	.....	.....	215	35	3,772	9,692	2
366,203	14,594	16,991	4,183	129,866	42	876	10	100	10,563	4,113	7,000	1,500	3,337	13,528	3
1,187,841	40,210	85,741	1,402	38,759	15,807	272,354	90	200	.....	.....	16,306	3,697	8,860	32,885	4
959,183	42,446	84,832	5,205	133,835	10,950	156,534	6	53	.....	.....	78,338	7,789	8,372	21,609	5

MATERIALS USED—continued.														
Fuel—Continued.				Fire clay and pot clay.								Pots, not including those made at works.		
Wood.		Petroleum.		Total.		American.		English.		German.				
Cords.	Cost.	Barrels.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Number.	Cost.	
12,217	$31,268	1,125	$2,250	20,963,666	$177,560	12,431,073	$103,567	542,700	$4,335	7,989,888	$69,658	1,446	$50,134	1
.....	.....	.....	.....	1,363,000	16,930	453,000	6,700	.....	.....	910,000	10,230	397	14,885	2
2,671	8,357	1,125	2,250	1,057,500	14,653	518,500	6,300	.....	.....	539,000	8,353	159	4,445	3
921	2,203	.....	.....	8,479,932	76,271	6,342,232	58,120	4,700	70	2,133,000	18,081	292	12,042	4
8,625	20,708	.....	.....	10,063,234	69,706	5,117,346	32,447	538,000	4,265	4,407,888	32,994	598	18,762	5

PRODUCTS.				EQUIPMENT OF PLANT (NUMBER).										
Total value.	Window glass.		All other products.	Furnaces.	Pots.	Clay grinding mills.	Flattening ovens.	Monkey ovens.	Horses.	Mules.	Wagons.	Carts.	Drays.	Cost of new construction.	
	Boxes.	Value.	Value.												
$9,058,802	3,768,884	$9,037,187	$21,615	146	1,299	59	135	19	139	14	14	59	54	$54,373	1
885,745	360,114	885,745	.....	15	138	4	13	2	6	.....	1	3	.....	.....	2
1,316,170	622,432	1,295,100	21,070	24	188	9	22	1	27	.....	4	18	6	1,800	3
3,648,577	1,430,455	3,648,577	.....	43	400	19	45	9	56	14	8	13	20	50,773	4
3,208,310	1,355,883	3,207,765	545	64	573	27	55	7	50	.....	1	25	28	1,800	5

TABLE 5.—DETAILED STATEMENT,

	STATES.	Number of establishments reporting.	CAPITAL.							
			Aggregate.	Value of plant.				Live assets.			
				Total.	Land.	Buildings.	Machinery, tools, and implements.	Total.	Raw materials.	Stock in process and finished products on hand.	Cash, bills and accounts receivable, and all sundries not elsewhere reported.
1	The United States....	125	$15,448,196	$8,203,164	$1,839,502	$3,838,739	$2,524,923	$7,245,032	$799,659	$2,856,889	$3,588,484
2	Illinois	4	783,138	384,190	80,802	214,164	89,224	398,948	96,249	96,647	206,052
3	Indiana	7	312,463	147,800	29,500	69,794	48,506	164,663	29,720	47,390	87,553
4	Maryland	5	371,205	212,008	35,000	127,419	49,589	159,197	28,051	121,146	10,000
5	New Jersey	4	866,099	407,425	21,500	215,000	170,925	458,674	68,183	176,333	214,158
6	New York	11	823,573	418,331	74,800	202,000	141,531	405,242	95,022	128,003	212,217
7	Ohio	30	2,487,144	1,391,102	191,322	773,998	425,782	1,096,042	104,574	463,103	528,365
8	Pennsylvania	53	8,432,043	4,542,218	1,292,245	1,888,364	1,361,609	3,889,825	322,889	1,579,388	1,987,548
9	West Virginia	7	825,313	377,757	33,000	213,000	131,757	447,556	36,319	144,052	266,585
10	All other states (a)	4	547,218	322,333	81,333	135,000	106,000	224,885	48,652	100,227	76,006

	STATES.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—continued.											
		Operatives and skilled.						Unskilled.					
		Males above 16 years.		Females above 15 years.		Children.		Males above 16 years.		Females above 15 years.		Children.	
		Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
1	The United States....	7,580	$3,709,088	738	$141,268	2,376	$374,070	3,409	$1,124,727	707	$101,282	1,850	$230,249
2	Illinois	139	84,740	20	3,860	50	8,900	420	132,850	.....	.....	202	19,570
3	Indiana	250	71,679	21	1,600	75	9,644	32	9,180	.....	.....	23	2,250
4	Maryland	49	29,334	.....	.....	3	936	157	30,345	24	6,864	240	28,572
5	New Jersey	231	151,700	22	4,060	50	5,000	327	102,427	15	3,825	350	33,400
6	New York	804	498,347	52	9,800	134	22,627	261	94,940	10	2,080	178	30,234
7	Ohio	1,844	846,421	209	34,162	397	62,228	660	221,830	312	36,340	291	43,522
8	Pennsylvania	3,765	1,782,082	338	72,986	1,491	239,420	1,325	438,572	262	38,436	515	65,544
9	West Virginia	215	95,494	63	12,800	159	23,806	110	44,795	64	8,996	31	5,400
10	All other states	283	148,391	13	2,000	12	1,500	108	49,788	20	4,732	20	1,667

	STATES.	MATERIALS USED—continued.											
		Salt.		Pearlash.		Litharge (or red lead).		Lime.		Arsenic.		Manganese.	
		Tons.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Bushels.	Cost.	Pounds.	Cost.	Pounds.	Cost.
1	The United States....	18	$100	2,544,978	$135,047	5,501,559	$300,096	366,037	$65,220	590,189	$19,226	436,304	$23,740
2	Illinois	.....	.....	.....	.....	40,000	2,400	10,525	2,340	59,176	1,853	13,936	848
3	Indiana	.....	.....	.....	.....	.....	.....	20,903	3,557	57,160	1,588	29,052	1,619
4	Maryland	.....	.....	77,000	3,550	94,000	4,975	17,675	1,009	14,020	395	14,600	765
5	New Jersey	.....	.....	34,035	1,877	39,873	2,118	19,750	4,027	15,906	492	15,565	735
6	New York	.....	.....	500,334	27,237	1,213,264	73,049	25,894	5,380	20,537	695	27,160	1,345
7	Ohio	.....	.....	335,216	16,985	786,991	35,810	71,890	12,688	167,756	5,500	106,281	5,785
8	Pennsylvania	18	100	1,474,093	77,440	3,086,681	167,499	155,643	29,328	159,897	5,808	209,810	11,464
9	West Virginia	.....	.....	50,000	3,500	100,000	5,800	14,107	3,237	89,822	2,606	16,450	985
10	All other states	.....	.....	74,300	4,458	140,750	8,445	29,650	3,654	5,915	199	3,450	194

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Georgia, 1; Kentucky, 1; Massachusetts, 2.

GLASSWARE, BY STATES: 1890.

MISCELLANEOUS EXPENSES.							AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.							
							Aggregates.		Officers or firm members actively engaged in the industry or in supervision.		Clerks.			
									Males above 16 years.		Males above 16 years.		Females above 15 years.	
Total.	Rent paid for tenancy.	Taxes.	Insurance.	Repairs, ordinary, of buildings and machinery.	Interest paid on cash used in the business.	All sundries not elsewhere reported.	Average number.	Total wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
$865,115	$40,180	$69,526	$107,951	$153,836	$118,859	$374,763	23,313	$10,166,203	232	$361,419	346	$330,463	17	$4,765
47,279	.....	3,199	4,836	16,118	3,793	19,333	1,095	456,557	8	18,700	9	10,360	.....	.....
29,812	.....	1,675	3,551	10,456	4,330	9,800	603	324,312	12	18,350	5	7,150	1	312
15,966	.....	3,508	5,078	3,500	3,380	500	772	368,551	.....	.....	10	9,768	.....	.....
8,943	.....	3,593	1,563	1,475	2,312	.....	1,376	647,353	3	4,700	33	34,697	4	865
58,887	17,800	3,503	6,500	10,210	5,800	15,074	1,668	791,678	9	15,750	17	19,100	.....	.....
175,767	200	13,809	25,326	16,183	27,710	92,539	4,715	1,942,348	65	83,737	68	62,794	10	2,938
444,293	22,180	32,760	53,738	82,735	62,414	190,466	11,085	4,771,118	110	183,782	173	156,690	2	650
40,805	.....	4,301	4,536	8,950	1,650	21,368	1,405	558,025	18	29,900	16	17,046	.....	.....
43,363	.....	3,178	2,823	4,209	7,470	25,683	594	306,261	7	11,500	15	12,858	.....	.....

AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—cont'd.						MATERIALS USED.								
Piecoworkers.														
Males above 16 years.		Females above 15 years.		Children.		Aggregate cost.	Mixing sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Nitrate of soda.	
Number.	Wages.	Number.	Wages.	Number.	Wages.		Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
5,568	$3,689,832	175	$42,756	315	$56,284	$4,925,234	115,746	$365,915	38,070	$1,274,382	200	$7,258	6,955	$274,686
247	182,577	.....	.....	.....	.....	256,067	7,248	11,277	2,608	86,294	.....	.....	579	18,330
184	204,147	.....	.....	.....	.....	187,706	5,996	15,004	2,333	85,270	165	6,281	263	10,190
242	257,326	.....	.....	42	5,406	139,971	6,721	20,133	927	25,170	.....	.....	230	8,371
341	306,585	.....	.....	.....	.....	180,364	4,720	17,966	1,826	54,133	.....	.....	263	11,189
130	85,920	10	2,080	63	10,800	337,499	3,995	20,385	1,239	44,677	.....	.....	232	10,797
827	540,851	12	2,516	20	5,000	982,667	24,867	74,107	8,977	282,817	.....	.....	1,028	59,021
2,855	1,733,737	90	27,324	150	30,986	2,446,746	55,200	180,958	17,831	615,915	20	756	3,277	138,658
636	306,060	63	10,836	21	2,892	277,033	5,350	20,845	2,209	77,725	.....	.....	416	15,140
106	72,625	.....	.....	10	1,200	108,181	1,649	5,240	60	2,381	15	221	67	2,990

MATERIALS USED—continued.														
Fuel.									Fire clay and pot clay.					
Total cost.	Natural gas.	Coal.		Coke.		Wood.		Petroleum.	Total.		American.		English.	
	Cost.	Tons.	Cost.	Tons.	Cost.	Cords.	Cost.	Barrels.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.
$767,534	$415,358	145,975	$282,225	6,528	$19,435	3,844	$13,327	18,935	$37,189	5,769,637	$44,320	4,096,660	$29,829	255,333	$2,699
51,656	.....	29,118	26,106	500	2,250	.....	.....	11,716	23,300	134,000	710	134,000	710	.....	.....
178	.....	30	178	.....	.....	.....	.....	.....	.....	85,600	615	77,600	540	.....	.....
31,360	.....	12,756	26,974	1,110	3,142	398	1,244	.....	.....	420,000	3,200	220,000	1,800	.....	.....
60,244	.....	21,137	51,784	160	630	2,200	7,830	.....	.....	1,015,070	7,302	789,790	5,826	50,000	375
89,363	.....	25,626	78,318	1,896	6,935	342	1,446	1,332	2,664	379,510	3,390	204,010	2,033	2,000	20
80,322	61,323	24,759	16,550	750	450	216	424	787	1,575	973,810	8,657	900,410	7,623	.....	.....
371,493	303,035	32,659	61,604	1,412	3,633	413	1,571	1,100	1,650	1,887,283	13,805	1,125,350	7,878	203,333	2,304
54,885	51,000	3,160	2,085	500	1,800	.....	.....	.....	.....	662,550	3,245	595,060	2,745	.....	.....
28,033	.....	5,524	18,026	200	595	275	812	4,000	8,000	211,814	3,396	50,500	674	.....	.....

TABLE 5.—DETAILED STATEMENT,

	STATES.	MATERIALS USED—continued.												
		Fire clay and pot clay—Continued.		Pots, not including those made at works.		Total cost of lumber, nails, straw, hay, casks, and barrels.	Lumber, including that in boxes purchased.		Nails.		Straw and hay.		Casks and barrels.		All other materials.
		German.													
		Pounds.	Cost.	Number.	Cost.		Number of M feet.	Cost.	Kegs.	Cost.	Tons.	Cost.	Number.	Cost.	Cost.
1	The United States...	1,417,644	$11,792	4,219	$255,535	$963,995	28,106	$353,518	10,093	$28,018	23,142	$177,426	1,647,307	$405,033	$428,180
2	Illinois	.....	.....	293	20,635	38,319	1,772	27,004	880	2,128	995	5,347	14,090	3,840	21,405
3	Indiana	8,000	75	154	10,370	48,445	2,425	38,870	820	2,695	932	5,880	3,000	1,000	4,589
4	Maryland	200,000	1,400	240	10,970	17,500	1,003	6,700	584	1,458	489	3,342	27,273	6,000	12,573
5	New Jersey	175,280	1,101	82	3,995	24,182	2,260	17,258	755	1,812	856	5,092	100	20	1,104
6	New York	173,500	1,337	135	5,390	42,479	731	6,936	370	1,013	955	7,830	119,429	26,700	13,312
7	Ohio	73,400	1,034	1,005	64,984	210,665	6,551	61,988	2,210	6,488	5,214	36,095	370,486	106,094	125,326
8	Pennsylvania	558,600	3,623	2,101	124,821	507,733	10,679	167,336	3,973	10,944	12,170	101,244	982,719	228,209	200,878
9	West Virginia	67,550	500	170	12,222	56,400	1,441	16,230	420	1,300	1,392	11,200	119,800	27,670	20,443
10	All other states	161,314	2,722	39	2,148	18,272	1,244	11,196	72	180	139	1,396	10,500	5,500	28,550

GLASSWARE, BY STATES: 1890—Continued.

Value of products.	EQUIPMENT OF PLANT (NUMBER).																	Cost of new construction.	
	Furnaces.	Pots.	Glory holes.	Shops.	Annealing ovens.	Leers.	Grinding machines.	Clay grinding mills.	Presses or pressing machines.	Grinding and engraving machines.	Crimping machines.	Finishing machines.	Horses.	Mules.	Wagons.	Carts.	Drays.		
$18,601,244	238	2,311	634	2,116	484	539	16	39	801	798	233	91	181	5	27	61	67	$153,443	1
940,883	9	117	28	76	62	11	.....	2	2	1	.....	.....	8	.....	.....	3	2	6,478	2
672,179	13	74	31	60	17	23	.....	.....	3	4	.....	.....	2	.....	2	.....	.....	7,500	3
674,900	7	77	15	113	15	20	.....	1	4	17	15	50	5	.....	2	1	1	12,000	4
1,235,426	13	112	61	96	27	27	.....	4	17	47	.....	.....	25	.....	.....	3	18	24,000	5
1,307,156	21	198	23	165	17	41	3	7	30	23	.....	.....	25	2	.....	14	14	.....	6
3,554,370	46	475	120	387	29	138	7	8	243	258	57	21	18	.....	2	9	7	16,850	7
8,700,124	106	1,055	294	1,098	294	238	4	12	403	303	151	20	81	2	18	20	20	62,165	8
945,234	17	144	24	104	18	33	2	3	85	60	10	.....	12	.....	3	5	4	3,850	9
561,072	6	59	8	37	5	8	.....	2	9	85	.....	.....	5	1	.....	6	1	20,600	10

TABLE 6.—DETAILED STATEMENT, GREEN

	STATES.	Number of establishments reporting.	CAPITAL.							
			Aggregate.	Value of plant.			Live assets.			
				Total.	Land.	Buildings.	Machinery, tools, and implements.	Total.	Raw materials.	Stock in process and finished products on hand.	Cash, bills and accounts receivable, and all sundries not elsewhere reported.
1	The United States	69	$7,165,078	$3,507,539	$849,965	$1,931,350	$726,224	$3,657,539	$559,205	$1,425,306	$1,673,028
2	Illinois	4	570,840	318,581	45,698	221,170	51,713	252,259	85,538	33,375	133,346
3	Indiana	3	347,030	155,000	27,000	76,000	52,000	192,000	31,000	93,000	68,000
4	New Jersey	18	1,910,872	853,775	106,000	588,200	159,575	1,057,097	132,073	453,950	471,074
5	New York	10	684,318	292,669	97,000	135,000	60,669	391,649	42,436	113,038	236,175
6	Ohio	7	492,843	246,278	29,500	136,016	80,762	246,565	35,584	95,891	115,090
7	Pennsylvania	13	2,311,156	1,186,872	389,100	516,751	232,021	1,174,284	185,405	417,995	570,884
8	All other states (a)	9	848,049	504,364	155,667	259,213	89,484	343,685	47,169	218,057	78,459

	STATES.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—continued.											
		Operatives and skilled.						Unskilled.					
		Males above 16 years.		Females above 15 years.		Children.		Males above 16 years.		Females above 15 years.		Children.	
		Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
1	The United States	1,800	$788,835	14	$1,351	706	$116,742	3,048	$845,256	112	$13,770	1,394	$159,175
2	Illinois	227	72,240	.....	.....	.....	.....	297	90,645	.....	.....	272	33,765
3	Indiana	79	22,634	9	351	68	5,862	397	93,333	100	12,000	.....	.....
4	New Jersey	583	241,752	.....	.....	110	17,123	986	293,726	3	360	501	57,204
5	New York	107	60,147	.....	.....	108	15,540	350	87,292	.....	.....	61	5,805
6	Ohio	95	36,350	.....	.....	46	4,462	168	54,516	5	1,200	90	11,780
7	Pennsylvania	553	258,227	5	1,000	312	63,984	485	122,051	4	210	263	25,581
8	All other states	156	97,485	.....	.....	62	9,771	359	103,693	.....	.....	207	25,040

	STATES.	MATERIALS USED—continued.													
		Lime.		Limestone.		Arsenic.		Manganese.		Fuel.					
										Total cost.	Natural gas.	Coal.		Coke.	
		Bushels.	Cost.	Tons.	Cost.	Pounds.	Cost.	Pounds.	Cost.		Cost.	Tons.	Cost.	Tons.	Cost.
1	The United States	448,637	$67,282	6,570	$18,760	140,196	$4,158	48,289	$2,005	$582,385	$36,766	162,970	$402,514	27,947	$28,471
2	Illinois	15,000	1,620	2,466	9,377	26,705	1,041	.....	.....	60,371	.....	34,663	40,297	8,733	19,340
3	Indiana	38,700	3,636	410	820	43,440	1,290	16,000	800	7,730	.....	4,864	6,080	280	1,400
4	New Jersey	160,773	23,345	60	120	47,026	1,084	1,500	50	204,966	.....	50,349	153,391	182	717
5	New York	40,168	11,180	293	587	190	11	2,329	170	62,287	.....	14,081	45,700	600	2,071
6	Ohio	33,150	4,020	566	1,480	11,650	272	4,900	122	15,845	3,256	8,806	11,422	40	130
7	Pennsylvania	96,636	13,416	2,055	5,626	4,217	219	2,600	278	111,584	33,510	22,269	63,112	.....	.....
8	All other states	64,211	10,065	720	750	6,368	241	20,960	585	119,652	.....	27,938	82,503	18,112	4,807

	STATES.	MATERIALS USED—continued.									Value of products.
		Total cost of lumber, nails, straw, hay, casks, and barrels.	Lumber, including that in boxes purchased.		Nails.		Straw and hay.		Casks and barrels.		All other materials.	
			Number of M feet.	Cost.	Kegs.	Cost.	Tons.	Cost.	Number.	Cost.	Cost.	
1	The United States	$333,104	27,195	$248,975	7,982	$21,105	8,186	$53,310	43,674	$9,714	$146,264	$8,521,464
2	Illinois	18,793	961	15,323	772	1,809	340	1,661	.....	.....	45,833	995,907
3	Indiana	57,125	3,274	49,466	988	2,452	945	5,207	.....	.....	1,210	491,485
4	New Jersey	81,747	9,528	58,035	3,008	7,891	2,764	15,699	500	125	37,327	2,666,556
5	New York	42,196	2,880	31,080	516	1,628	772	5,168	20,886	4,320	10,570	693,686
6	Ohio	29,089	2,380	24,385	486	1,172	481	2,727	6,150	1,705	15,966	519,015
7	Pennsylvania	75,549	6,605	52,594	1,628	4,195	2,340	18,070	2,608	684	15,243	2,072,089
8	All other states	27,705	1,567	18,092	584	1,958	544	4,775	13,580	2,880	20,115	1,082,726

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: California, 1; Colorado, 1; Georgia, 1; Kentucky, 1; Maryland, 2; Missouri, 2; Wisconsin, 1.

AND BLACK GLASS, BY STATES: 1890.

MISCELLANEOUS EXPENSES.							AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.							
							Aggregates.		Officers or firm members actively engaged in the industry or in supervision.		Clerks.			
									Males above 16 years.		Males above 16 years.		Females above 15 years.	
Total.	Rent paid for tenancy.	Taxes.	Insurance.	Repairs, ordinary, of buildings and machinery.	Interest paid on cash used in the business.	All sundries not elsewhere reported.	Average number.	Total wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
$333,036	$20,717	$33,323	$50,003	$62,709	$83,287	$82,997	10,400	$4,454,304	70	$94,641	129	$100,275	9	$2,886
58,108	.....	1,502	4,817	11,202	1,184	39,403	1,224	521,168	6	12,300	5	3,850	.....	.....
33,445	.....	1,425	3,020	8,000	21,000	.....	904	260,603	2	800	5	2,943	2	750
66,808	1,950	10,233	11,259	14,075	17,064	11,627	3,360	1,478,894	22	28,341	63	46,184	5	1,544
30,479	13,600	4,171	3,554	2,100	5,709	1,345	882	315,656	5	8,000	12	8,958	2	592
20,665	.....	1,557	4,987	4,721	7,270	2,130	582	266,623	14	16,700	6	5,350	.....	.....
75,038	5,042	8,080	15,482	12,425	14,217	19,792	2,346	1,072,198	10	9,900	25	22,466	.....	.....
48,493	125	6,355	6,884	9,586	16,843	8,700	1,102	539,162	11	18,600	13	10,524	.....	.....

AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—continued.						MATERIALS USED.								
Piecoworkers.							Mixing sand.		Soda ash (carbonate of soda).		Salt cake (sulphate of soda).		Salt (chloride of sodium).	
Males above 16 years.		Females above 15 years.		Children.		Aggregate cost.								
Number.	Wages.	Number.	Wages.	Number.	Wages.		Tons.	Cost.	Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
3,026	$2,314,648	72	$11,225	20	$5,500	$2,594,216	95,790	$181,179	35,992	$1,115,753	2,268	$35,523	2,305	$12,451
417	308,368	.....	.....	.....	.....	310,838	12,130	18,980	4,391	140,314	46	389	598	3,032
192	113,930	50	8,000	.....	.....	166,823	7,040	17,700	2,708	69,487	120	2,040	10	60
1,085	792,500	2	160	.....	.....	755,386	29,964	42,783	10,635	314,813	1,500	22,500	80	768
211	126,257	20	3,065	.....	.....	244,681	8,001	17,714	3,266	93,326	113	1,450	104	430
158	136,265	.....	.....	.....	.....	156,984	6,108	12,517	2,133	65,016	169	2,888	127	661
669	563,279	.....	.....	20	5,500	611,850	22,954	53,713	9,439	307,625	195	2,823	541	5,021
294	274,049	.....	.....	.....	.....	347,654	9,593	17,772	3,420	125,172	125	3,433	845	2,479

MATERIALS USED—continued.													
Fuel—Continued.				Fire clay and pot clay.								Pots, not including those made at works.	
Wood.		Petroleum.		Total.		American.		English.		German.			
Cords.	Cost.	Barrels.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Pounds.	Cost.	Number.	Value.
39,193	$90,884	18,600	$23,750	5,246,773	$44,446	1,922,755	$13,765	290,848	$4,125	3,033,170	$26,556	1,200	$50,906
329	728	.....	.....	176,000	1,275	176,000	1,275	.....	.....	.....	.....	105	9,813
100	250	.....	.....	150,000	1,125	150,000	1,125	.....	.....	.....	.....	100	3,800
13,346	50,858	.....	.....	1,768,720	17,599	560,000	2,674	240,000	3,482	968,720	11,443	277	8,284
18,334	14,507	.....	.....	638,163	4,145	100,315	981	50,848	643	487,000	2,521	15	615
400	1,037	.....	.....	266,440	2,020	244,440	1,900	.....	.....	22,000	120	147	6,188
4,748	14,912	.....	.....	1,611,450	13,222	396,000	3,710	.....	.....	1,215,450	9,512	210	7,581
1,936	8,592	18,600	23,750	636,000	5,060	296,000	2,100	.....	.....	340,000	2,960	346	14,625

EQUIPMENT OF PLANT (NUMBER).												Cost of new construction.
Furnaces.	Pots.	Glory holes.	Shops.	Annealing ovens.	Leers.	Grinding machines.	Clay grinding mills.	Horses.	Mules.	Wagons.	Carts.	Drays.	
131	597	276	758	1,116	60	47	39	178	6	21	62	59	$82,969
9	23	20	39	201	.....	4	1	16	.....	.....	3	4	20,610
8	42	1	17	28	20	4	.....	5	.....	.....	3	1	2,000
43	169	138	227	325	23	12	9	70	.....	8	26	24	17,959
18	61	18	71	87	6	4	8	22	.....	.....	9	9	250
9	46	10	54	93	4	6	2	3	.....	1	2	1	1,500
30	177	76	218	249	3	10	14	31	6	7	11	11	33,000
14	79	13	132	133	4	7	5	31	.....	5	8	9	7,650

TABLE 7.—CLASSIFICATION OF EMPLOYÉS AND WAGES, AND AVERAGE NUMBER OF EMPLOYÉS

	STATES.	Number of establishments reporting.	AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS.													
			Aggregates.		Officers or firm members actively engaged in the industry or in supervision.			Clerks.						Operatives and skilled.		
					Males above 16 years.			Males above 16 years.			Females above 15 years.			Males above 16 years.		
			Average number.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.
1	The United States	294	45,987	$22,118,522	413	$40.70	$656,407	640	$22.30	$560,795	42	$8.54	$15,359	14,789	$12.88	$7,542,298
2	Illinois	13	2,793	1,232,761	17	42.79	30,560	14	25.82	14,210	.....	.....	.....	667	14.93	338,333
3	Indiana	21	3,089	1,544,831	25	37.81	36,820	42	19.68	32,860	12	10.30	6,002	851	11.21	382,943
4	Maryland	11	1,413	708,736	.....	.....	.....	16	19.25	12,176	.....	.....	.....	133	13.48	67,914
5	Massachusetts	6	514	219,427	3	61.22	6,500	15	21.07	11,274	.....	.....	.....	270	12.13	118,549
6	Missouri	5	1,152	596,239	15	63.91	38,150	23	19.02	15,661	1	10.01	271	543	11.79	304,557
7	New Jersey	34	5,840	2,862,719	32	31.77	41,166	108	19.82	88,047	12	7.02	3,406	1,033	12.38	523,731
8	New York	30	3,285	1,484,639	20	36.40	28,463	34	26.84	32,358	2	8.04	592	1,277	15.04	775,805
9	Ohio	59	6,651	3,131,578	116	33.25	144,921	89	24.12	82,064	11	7.66	3,338	2,584	14.25	1,351,932
10	Pennsylvania	99	18,934	9,247,160	153	46.40	275,337	267	22.96	241,553	4	8.97	1,750	7,098	12.11	3,494,822
11	West Virginia	7	1,405	558,025	18	39.66	29,900	16	24.82	17,046	.....	.....	.....	215	10.70	95,494
12	All other states (*a*)	9	911	533,007	14	40.06	24,650	16	20.01	13,546	.....	.....	.....	118	17.79	88,318

	STATES.	Average number of hours in ordinary day of labor.		WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF EMPLOYÉS AT EACH RATE, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK. (*b*)											
				Males above 16 years.												
		May to November.	November to May.	Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.	$7 and over but under $8.	$8 and over but under $9.	$9 and over but under $10.	$10 and over but under $12.	$12 and over but under $15.	$15 and over but under $20.	$20 and over but under $25.	$25 and over.
1	The United States	9.26	9.30	25,390	3,121	1,312	1,674	2,265	1,653	3,320	2,425	2,922	2,539	2,104	2,055
2	Illinois	9.31	9.65	1,578	360	13	119	32	206	162	113	222	51	144	156
3	Indiana	9.48	9.48	1,786	426	36	75	302	170	253	128	85	134	47	130
4	Maryland	9.32	9.45	570	266	7	4	63	51	49	59	19	27	13	12
5	Massachusetts	9.33	9.17	370	.....	45	47	27	23	19	21	50	79	53	6
6	Missouri	9.80	9.80	904	11	10	129	45	16	272	88	106	131	42	53
7	New Jersey	9.26	9.18	2,804	255	261	242	684	170	272	243	101	331	95	150
8	New York	9.00	9.32	2,224	143	49	195	181	151	252	227	261	286	245	234
9	Ohio	9.47	9.48	3,914	547	332	197	167	125	478	290	346	405	557	470
10	Pennsylvania	9.11	9.12	10,441	1,072	509	636	715	679	1,377	1,189	1,626	994	846	798
11	West Virginia	9.36	9.36	368	41	50	7	18	19	55	37	43	61	15	22
12	All other states	9.33	9.22	431	.....	.....	23	31	43	130	30	63	40	47	24

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: California, 1; Colorado, 1; Delaware, 1; Georgia, 2; Kentucky, 2; Michigan, 1; Wisconsin, 1.

AT THE DIFFERENT WEEKLY RATES OF PAY, GLASS MANUFACTURE, BY STATES: 1890.

AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS—continued.

Operatives and skilled—Continued.						Unskilled.									Pieceworkers.		
Females above 15 years.			Children.			Males above 16 years.			Females above 15 years.			Children.					
Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Total wages.	
802	$4.95	$157,352	3,223	$3.99	$525,640	9,548	$8.46	$3,122,430	824	$3.58	$115,712	3,275	$3.05	$393,106	12,431	$9,029,423	1
20	4.69	3,860	50	4.32	8,960	880	8.32	290,648	.....	.....	.....	474	2.72	53,335	671	492,975	2
30	2.55	1,951	143	3.03	15,506	868	7.25	248,463	105	3.00	12,660	37	4.30	3,728	976	803,998	3
.....	.....	.....	8	3.00	936	421	5.06	77,988	24	6.95	6,864	278	2.93	32,433	533	510,425	4
13	4.90	2,000	12	3.98	1,500	82	8.85	24,792	6	6.00	1,732	.....	.....	.....	113	53,080	5
.....	.....	.....	70	3.48	11,988	323	9.14	106,935	.....	.....	.....	27	5.21	5,706	150	112,881	6
22	4.36	4,060	160	3.28	22,123	1,631	7.77	499,772	18	5.46	4,185	866	2.70	92,274	1,958	1,583,955	7
52	4.52	9,800	242	4.12	38,167	893	8.85	277,935	10	5.33	2,080	239	4.03	36,030	516	282,800	8
209	4.07	34,162	443	3.85	66,690	1,125	9.22	386,165	317	3.27	37,549	381	3.71	55,302	1,376	969,455	9
393	5.68	88,719	1,896	4.19	330,753	2,923	9.08	1,042,252	266	3.54	38,046	780	3.11	91,749	5,154	3,641,579	10
63	4.79	12,800	159	3.49	23,806	119	8.58	44,795	64	3.36	8,996	31	3.66	5,400	720	319,788	11
.....	.....	.....	40	3.31	5,271	283	9.90	122,685	14	4.60	3,000	162	2.38	17,050	264	258,487	12

WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF EMPLOYÉS AT EACH RATE, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK—continued.

Females above 15 years.										Children.					
Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.	$7 and over but under $8.	$8 and over but under $9.	$9 and over but under $10.	$10 and over but under $12.	$12 and over but under $15.	$15 and over but under $20.	Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.	$7 and over.	
1,668	1,199	155	158	21	78	38	15	1	3	6,498	5,863	409	115	111	1
20	20	.....	.....	.....	.....	.....	.....	.....	.....	524	524	.....	.....	.....	2
147	130	.....	6	7	.....	.....	1	.....	3	180	173	.....	7	.....	3
24	.....	.....	24	.....	.....	.....	.....	.....	.....	286	286	.....	.....	.....	4
19	8	6	4	1	.....	.....	.....	.....	.....	12	12	.....	.....	.....	5
1	.....	.....	.....	.....	.....	.....	1	.....	.....	97	71	10	1	15	6
52	14	7	28	1	.....	1	.....	1	.....	1,026	1,006	19	1	.....	7
64	31	24	5	2	.....	2	.....	.....	.....	481	389	49	.....	43	8
537	455	40	6	.....	6	27	3	.....	.....	824	655	144	25	.....	9
663	400	78	85	10	72	8	10	.....	.....	2,676	2,359	183	81	53	10
127	127	.....	.....	.....	.....	.....	.....	.....	.....	190	190	.....	.....	.....	11
14	14	.....	.....	.....	.....	.....	.....	.....	.....	202	198	4	.....	.....	12

b In comparing the weekly rates of wages and number of employés at each rate with the average weekly earnings, it must be remembered that it is not practicable to obtain true average weekly earnings from the table of weekly rates, because the term of employment varies for employés reported at the respective rates.

TABLE 8.—RANGE AND AVERAGE RATE OF DAILY WAGES, BY OCCUPATIONS: 1890.

[The employés are "males 16 years and over" unless otherwise stated.]

PLATE GLASS MANUFACTURE.

OCCUPATIONS.	Number of employés reported.	Range of daily wages.	Average daily wages.	OCCUPATIONS.	Number of employés reported.	Range of daily wages.	Average daily wages.
Blacksmiths	19	$2.00 to $3 50	$2.73	Laborers	127	$1.15 to $1.50	$1.30
Bricklayers	42	1.50 to 3.50	2.64	Machinists	134	2.25 to 3.46	2.33
Carpenters	82	1.00 to 3.33	2.16	Mill men	827	1.15 to 2.00	1.48
Crocus men	18	1.75 to 3.08	2.00	Mixers	93	1.15 to 2.00	1.50
Cutters	83	1.15 to 4.00	2.28	Plaster burners	16	1.50 to 3.00	1.68
Engineers	146	1.75 to 3.00	2.32	Polishers	402	1.74 to 2.75	2.45
Firemen	63	1.50 to 2.50	1.72	Pot makers	68	1.15 to 3.00	2.12
Founders	55	2.00 to 3.85	3.57	Roller men	222	1.15 to 3.00	1.87
Furnace builders	6	3.50 to 6.00	4.78	Sand quarrymen	28	1.30 to 1.63	1.42
Furnace men	155	1.20 to 3.00	2.12	Smoothers:			
Gas makers	52	1.75 to 2.33	1.94	Males 16 years and over	108	1.50 to 1.75	1.72
Glass packers	79	1.00 to 2.50	1.77	Females 15 years and over	47	1.00 to 1.10	1.05
Grinders	502	2.00 to 2.25	2.16	Teamsters	38	1.15 to 2.25	1.46
Kiln firemen	31	1.25 to 3.00	1.85	Teemers or pourers	60	1.35 to 3.50	2.55

WINDOW GLASS MANUFACTURE.

Batch wheelers	100	1.00 to 2.32	1.75	Layers-out:			
Blacksmiths	12	2.00 to 4.16	2.38	Males 16 years and over	108	1.33 to 2.73	1.82
Blowers	983	2.70 to 8.00	6.20	Males under 16 years	23	0.60 to 1.81	1.44
Boss blowers	100	3.33 to 11.50	6.84	Leer tenders	267	1.10 to 2.98	1.72
Boss cutters	58	2.50 to 7.50	5.82	Lime sifters	33	1.16 to 2.00	1.68
Carpenters	21	1.00 to 3.46	2.15	Managers	71	2.33 to 9.62	4.71
Clay trampers	154	1.00 to 2.50	1.37	Master teasers	110	1.66 to 6.66	3.78
Coal wheelers	44	1.16 to 2.32	1.54	Master teasers' helpers	152	1.33 to 2.50	1.92
Cutters	392	3.00 to 7.00	4.75	Mixers	132	1.12 to 2.50	1.89
Drivers	104	1.17 to 2.50	1.54	Pot makers	70	1.50 to 4.03	2.95
Engineers	7	1.25 to 2.50	1.59	Pot makers' assistants	6	1.25 to 1.66	1.55
Flatteners	242	2.00 to 10.00	5.38	Roller boys:			
Gatherers or tenders	976	2.88 to 5.03	3.94	Males 16 years and over	214	0.50 to 2.33	1.09
Glass packers	133	0.50 to 4.16	2.10	Males under 16 years	67	0.67 to 1.33	0.98
Laborers	593	1.00 to 1.75	1.31	Teasers	226	1.29 to 2.50	1.86
Layers-in	153	0.92 to 2.70	1.57				

GLASSWARE MANUFACTURE.

Blowers	2,488	2.00 to $8.00	4.58	Machinists	37	1.75 to 5.00	2.58
Carrying-in boys:				Managers	115	2.00 to 9.61	4.90
Males 16 years and over	901	0.43 to 1.10	0.72	Mixers	240	1.17 to 4.00	1.87
Males under 16 years	1,353	0.40 to 0.90	0.64	Mold holders:			
Clay trampers	47	1.00 to 2.00	1.50	Males 16 years and over	570	0.50 to 1.20	0.83
Cleaning-off boys:				Males under 16 years	552	0.45 to 1.10	0.70
Males 16 years and over	694	0.50 to 1.50	0.84	Mold makers	374	2.00 to 7.00	3.35
Males under 16 years	633	0.50 to 1.10	0.69	Packers:			
Cutters:				Males 16 years and over	623	1.00 to 3.50	2.03
Males 16 years and over	574	1.33 to 5.00	2.94	Females 15 years and over	27	0.67 to 1.33	0.96
Males under 16 years	22	0.75 to 1.50	0.88	Pot fillers	131	1.25 to 2.33	1.77
Females 15 years and over	75	0.62 to 1.25	1.02	Pot makers	32	1.30 to 3.66	2.71
Drivers	112	1.25 to 3.25	1.74	Pressers	594	2.50 to 5.00	3.89
Engravers:				Stickers-up:			
Males 16 years and over	245	2.50 to 5.00	3.04	Males 16 years and over	1,398	0.46 to 1.50	0.87
Females 15 years and over	33	1.25 to 1.50	1.34	Males under 16 years	795	0.40 to 1.10	0.72
Engineers	112	1.50 to 4.00	2.40				
Finishers	664	1.35 to 6.00	3.07	Teasers	158	1.18 to 3.00	2.21
Gatherers	1,600	1.00 to 3.20	2.20				
Laborers:							
Males 16 years and over	1,214	1.10 to 2.30	1.51				
Males under 16 years	73	0.55 to 0.83	0.73				
Females 15 years and over	509	0.50 to 1.50	0.85				
Females under 15 years	9	0.50 to 0.75	0.58				

GREEN AND BLACK GLASS MANUFACTURE.

Batch wheelers	49	1.00 to 2.29	1.51	Laying-up boys:			
Blacksmiths	9	1.60 to 3.33	2.27	Males 16 years and over	397	0.55 to 2.13	1.10
Boss blowers	61	2.50 to 7.00	5.27	Males under 16 years	74	0.50 to 1.50	0.82
Boss packers	67	1.28 to 3.33	2.02	Managers	67	1.73 to 9.00	4.22
Bottle blowers	1,139	2.50 to 6.50	4.73	Master teasers	82	1.65 to 5.00	3.10
Carboy blowers	5	6.00 to 10.00	8.40	Mixers	149	1.17 to 2.75	1.68
Carrying-in boys:				Other blowers	69	2.50 to 6.00	5.48
Males 16 years and over	759	0.42 to 1.25	0.64	Packers	376	1.00 to 2.50	1.60
Males under 16 years	964	0.50 to 0.83	0.57	Pot makers	24	1.25 to 5.00	2.80
Clay trampers	50	1.00 to 2.00	1.40	Pot makers' assistants	30	1.00 to 2.00	1.44
Coal wheelers	60	1.00 to 2.00	1.51	Stickers-up:			
Demijohn blowers	6	6.00 to 8.33	7.73	Males 16 years and over	425	0.50 to 1.50	0.72
Demijohn coverers	41	1.00 to 2.00	1.26	Males under 16 years	575	0.45 to 0.75	0.53
Engineers	10	1.33 to 3.00	1.93	Teamsters	20	1.25 to 3.00	1.70
Fillers-in or helpers	125	1.17 to 2.50	1.73	Teasers	127	1.18 to 3.00	1.77
Finishers	208	1.50 to 5.50	4.48	Vial blowers	441	2.50 to 6.00	4.72
Gatherers:				Ware boys:			
Males 16 years and over	660	0.60 to 2.07	1.21	Males 16 years and over	141	0.67 to 3.00	1.56
Males under 16 years	52	0.66 to 1.25	1.02	Males under 16 years	80	0.60 to 1.33	0.68
Grinders	56	0.60 to 5.00	1.74				
Laborers	111	1.25 to 1.75	1.50				
Lime sifters	19	1.17 to 2.00	1.52				

COKE.

COKE.

BY JOSEPH D. WEEKS.

The accompanying tables presenting the statistics of the manufacture of coke in the United States during the calendar year 1889 include only the figures relating to the production of coke from bituminous coal in ovens, pits, or mounds. The total output of the coke so produced was 10,008,169 short tons, valued at $16,494,454, as compared with a production in 1880 of 2,752,475 tons, valued at $5,359,489. Coke as a by-product of gas works or petroleum refineries is excluded from the tabular statement here given, being reported with the statistics of gas manufacture and petroleum refining, and to include the figures in this report would duplicate the results of census investigation. The quantity and value of coke produced as the residual product of the manufacture of gas and refined petroleum during the census year ending May 31, 1890, as shown by the reports made to this office, were as follows: gas works, 56,624,344 bushels, valued at $3,868,924, and in petroleum refining, 494,221 bushels, with a value of $56,997, a grand total for the two industries of 57,118,565 bushels, valued at $3,925,921, being equal in quantity to about one-ninth and in value to nearly one-fourth of the production by ovens, pits, and mounds. The average value per ton of oven coke, as shown in the accompanying tables, was $1.65, and of coke produced by gas works and petroleum refineries was approximately $3.44 per ton. The difference in value of the two products is due to the fact that gas coke, being principally the product of gas works situated in the centers of manufacturing industries, has a ready market at the point of production, in addition to which it is sold to a considerable extent in a retail way for domestic consumption, and therefore commands a much higher price per ton.

The manufacture of coke is chiefly conducted in connection with the mining of coal, but in the treatment of the subject in this report it is regarded as an entirely separate and distinct industry from coal mining, and only those items of capital, labor, expense, and product which pertain strictly to coke manufacture are included in the tabular statements. Owing to the close connection between the two industries it has been difficult in many instances for manufacturers to separate their accounts so as to make an exact report of each operation.

SUMMARY OF STATISTICS.

The following comparative statement presents the statistics concerning the manufacture of oven coke as reported at the censuses of 1880 and 1890, with the percentage of increase in each item during the decade. This statement includes statistics for active establishments only.

COMPARATIVE SUMMARY, COKE MANUFACTURE: 1880 AND 1889.

ITEMS.	1880	1889	Percentage of increase.
Number of establishments reporting	126	218	73.02
Capital	$4,709,858	$17,462,729	266.11
Miscellaneous expenses (*a*)	.....	$394,784	.....
Average number of employés (aggregate)	3,140	9,159	191.69
Total wages	$1,197,744	$4,186,264	249.51
Officers, firm members, and clerks: (*b*)			
Average number	.....	161	.....
Total wages	.....	$113,632	.....
All other employés: (*b*)			
Average number	.....	8,998	.....
Total wages	.....	$4,072,632	.....
Cost of materials used	$2,995,441	$11,509,737	284.24
Value of products	$5,359,489	$16,498,345	207.83

a This item was not reported at the census of 1880. *b* Not reported separately at the census of 1880.

Previous census inquiries have not shown data relating to cost of manufacture other than the items of wages and materials. The census of 1890 was designed to embrace the entire cost of production, except interest on capital and depreciation of plant. The difference between the cost of production and the value of the product must not, therefore, be considered as the profit or earnings of the capital invested, and for the additional reason that the cost of selling and mercantile losses are not included. The census inquiry was intended only to ascertain the relation that capital, miscellaneous expenses, wages, cost of materials, and value of product bear to each other.

Owing to numerous consolidations of coke-making plants since 1880, and the fact that at the census of 1880 each bank of ovens was reported as a separate establishment, while at 1890 the entire plant is considered and counted as but one establishment, the number of establishments as given in the above table fails to exhibit the growth of the industry during the past decade. The number of active establishments has increased from 126 in 1880 to 218 in 1889, while the number of ovens, pits, or mounds has more than trebled, increasing in the 10 years from 9,738 to 32,659.

The following summary shows the number of ovens, pits, or mounds, and quantity and value of the coke produced; also the quantity of coal used and the yield of coal in coke as reported at the two census periods:

COMPARATIVE STATEMENT OF OVENS AND QUANTITY AND VALUE OF COKE, COKE MANUFACTURE: 1880 AND 1889.

ITEMS.	1880	1889
Ovens, pits, or mounds (active)	9,738	32,659
Coal used, short tons	4,360,110	15,795,087
Coke produced, short tons	2,752,475	10,008,169
Total value of coke at ovens	$5,350,480	$16,494,454
Average yield of coke per oven (tons)	283	306
Value of coke at ovens (per ton)	$1.95	$1.65
Yield of coal in coke (per cent)	63.13	63.36

The following statement presents the total capital and the different items of capital invested in both active and idle plants as reported at the Eleventh Census:

STATEMENT OF CAPITAL IN BOTH ACTIVE AND IDLE ESTABLISHMENTS, COKE MANUFACTURE: 1889.

ITEMS.	Active establishments.	Idle establishments.
Number of establishments reporting	218	28
Capital—aggregate	$17,462,729	$444,483
Land	1,405,342	6,425
Buildings	869,725	48,723
Ovens	10,817,624	312,661
Machinery, tools, and implements	823,790	44,791
Railway plant and water supply	2,063,803	24,983
Live capital	1,482,445	6,900

The proportion that the number of idle establishments and the amount of idle capital bear to the whole is inconsiderable, the number of idle establishments being but 11.38 per cent of the whole number, and the amount of idle capital being but 2.48 per cent of the whole amount of capital invested. The establishments that were idle were small and insignificant, showing an average capital of but $15,874 as compared with an average capital of $80,104 for the works in active operation.

The following is a statement for the United States, by states, of the number of idle establishments, with the amount of capital invested and the characteristics of the plant:

STATEMENT OF IDLE ESTABLISHMENTS, COKE MANUFACTURE, BY STATES: 1889.

STATES.	Number of establishments reporting.	Capital.	OVENS, PITS, OR MOUNDS (NUMBER).				Washers. (Number.)	Crushers. (Number.)
			Total.	Beehive ovens.	Belgian or flue ovens.	Other style ovens.		
The United States	28	$444,483	1,247	1,142	65	40	7	5
Alabama	1	19,000	76	76	.....	.....	.....	.....
Colorado	3	12,600	48	8	.....	40	.....	.....
Illinois	1	50,000	102	102	.....	.....	1	1
Indiana	1	1,800	9	9	.....	.....	.....	.....
Kansas	1	5,136	16	16	.....	.....	.....	.....
Kentucky	1	600	2	2	.....	.....	.....	.....
Pennsylvania	15	317,297	884	819	65	.....	6	4
Tennessee	2	16,050	58	58	.....	.....	.....	.....
West Virginia	3	22,000	52	52	.....	.....	.....	.....

OVENS.

The following is a classified statement of the number of ovens, pits, or mounds reported at the censuses of 1880 and 1890:

COMPARATIVE NUMBER OF OVENS, COKE MANUFACTURE, BY CLASSES: 1880 AND 1889.

CLASSIFICATION.	NUMBER OF OVENS, PITS, OR MOUNDS, BOTH ACTIVE AND IDLE.	
	1880	1889
Total	10,116	33,906
Beehive	9,728	33,271
Belgian or flue	316	298
Other styles	30	318
Pits or mounds	42	19

Notwithstanding the numerous experiments which have been made to save the waste products of combustion in the making of coke, very little progress has been made in this country during the past decade in the erection and operation of ovens designed for this purpose. But a comparatively small quantity of coke was made in 1889 in flue or retort ovens, or what is generally known as the belgian oven. The solid wall type of oven, usually the beehive form, continues to be almost exclusively used. The ovens classified in the above table under the heading of "Other styles" consist principally of modified forms of the beehive oven.

EMPLOYÉS AND WAGES.

The average number of employés directly engaged in the manufacture of coke in 1889, excluding officers, firm members, and clerks, was 8,998, receiving $4,072,632 in wages, as compared with 3,140 employés in 1880, receiving $1,197,744. In making comparisons of employés and wages at the two census periods, it should be considered that the schedule of inquiry used at the Eleventh Census provided for a more thorough exposition of the different classes of employés and the amount of wages. The classification of employés made at the Tenth Census was that of males 16 years and upward, females 15 years and upward, males under 16 years, and females under 15 years, with a further classification by occupations with the daily rates. The classification used at the Eleventh Census was as follows: first, operatives, engineers, and other skilled workmen, overseers and foremen, or superintendents (not general superintendents or managers); second, officers or firm members; third, clerks; fourth, watchmen, laborers, teamsters, and other unskilled workmen; fifth, pieceworkers (not included in the foregoing). A further division of the above classes into males, females, and children was required. The schedule used at the Eleventh Census has, without doubt, elicited a more complete return of officers, firm members, and clerks, and the total wages. The schedule used at the Tenth Census, in the matter of wages paid, asked only for the "total wages paid for all labor done at coke works".

The following statement shows the average number and total wages of employés reported at the census of 1890, classified as officers or firm members; clerks; skilled and unskilled, and pieceworkers:

STATEMENT OF EMPLOYÉS AND WAGES, COKE MANUFACTURE, BY CLASSES: 1889.

CLASSES OF EMPLOYÉS.	Average number.	Total wages.
Total	9,159	$4,186,264
Officers or firm members	37	33,297
Clerks	124	80,335
Skilled and unskilled	4,480	1,906,020
Pieceworkers	4,518	2,166,612

The weekly rates of wages paid and the average number of employés at each rate are given in the statement on the following page, which includes all classes of employés except pieceworkers.

AVERAGE NUMBER OF EMPLOYÉS AT DIFFERENT WEEKLY RATES OF WAGES, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK, COKE MANUFACTURE: 1889.

WEEKLY RATES OF WAGES.	AVERAGE NUMBER OF EMPLOYÉS.		
	Males above 16 years.	Females above 15 years.	Children.
Total	4,608	1	32
Under $5	19	.....	29
$5 and over but under $6	13	.....	2
6 and over but under 7	345	.....	1
7 and over but under 8	1,072	.....	.....
8 and over but under 9	704	1	.....
9 and over but under 10	853	.....	.....
10 and over but under 12	289	.....	.....
12 and over but under 15	895	.....	.....
15 and over but under 20	316	.....	.....
20 and over but under 25	26	.....	.....
25 and over	76	.....	.....

The average number of employés and average weekly earnings per employé for each class of employés, not including pieceworkers, are shown in the following table, by states and territories:

AVERAGE WEEKLY EARNINGS PER EMPLOYÉ OF EACH CLASS, COKE MANUFACTURE, BY STATES AND TERRITORIES: 1889.

STATES AND TERRITORIES.	OFFICERS OR FIRM MEMBERS.		CLERKS.				OPERATIVES, SKILLED AND UNSKILLED.			
	Males above 16 years.		Males above 16 years.		Females above 15 years.		Males above 16 years.		Children.	
	Average number.	Average weekly earnings per employé.	Average number.	Average weekly earnings per employé.	Average number.	Average weekly earnings per employé.	Average number.	Average weekly earnings per employé.	Average number.	Average weekly earnings per employé.
The United States	37	$21.24	123	$14.96	1	$8.93	4,448	$10.15	32	$3.64
Alabama	3	29.49	5	12.17	.....	.....	376	8.00	15	3.96
Colorado	1	25.76	5	15.20	.....	.....	138	12.29	.....	.....
Indiana	.....	.....	.....	.....	.....	.....	18	7.44	.....	.....
Kansas	.....	.....	.....	.....	.....	.....	18	9.96	.....	.....
Kentucky	1	11.54	1	7.69	.....	.....	15	10.73	.....	.....
Missouri	.....	.....	.....	.....	.....	.....	5	9.98	.....	.....
Ohio	.....	.....	3	10.67	.....	.....	94	9.03	.....	.....
Pennsylvania	15	20.59	83	15.81	1	8.93	2,825	10.99	3	3.80
Tennessee	.....	.....	.....	.....	.....	.....	163	7.71	7	2.89
West Virginia	17	21.05	23	12.73	.....	.....	659	7.91	7	3.92
All other states and territories (a)	.....	.....	3	16.55	.....	.....	137	9.73	.....	.....

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Georgia, 1; Illinois, 2; Indian territory, 1; Montana, 2; Utah, 1; Virginia, 2; Washington, 1; Wisconsin, 1.

Of the entire number of establishments 168 report as to periods elapsing between wage payments, 94 reporting monthly payments, 66 fortnightly, and 8 weekly. Of the 147 establishments in 1880, 1 reported quarterly payments, 86 monthly, 3 every three weeks, 14 fortnightly, and 6 weekly.

The returns at the census of 1890 show that the system of company stores in connection with the work is followed by 83 operators; 87 report that they do not conduct such stores, while 48 establishments make no report under this head. In 1880 returns in regard to the method of wage payments were received from 118 establishments, 56 reporting the operation of stores, and 62 making payments in cash.

MATERIALS USED.

Coal is the principal item of expense in the manufacture of coke, and is the only material entering into the product. The quantity and value of coal consumed in coke making at the two censuses are given in the following table, by states and territories:

COMPARATIVE STATEMENT OF QUANTITY AND COST OF COAL USED, COKE MANUFACTURE, BY STATES AND TERRITORIES: 1880 AND 1889.

STATES AND TERRITORIES.	COAL CONSUMED (SHORT TONS).			
	1880		1889	
	Tons.	Cost.	Tons.	Cost.
The United States	4,360,110	$2,761,657	15,795,087	$11,110,700
Alabama	67,376	75,314	1,789,047	1,755,876
Colorado	29,500	29,500	323,731	399,778
Indiana	1,500	2,025	16,428	16,156
Kansas			21,600	9,011
Kentucky			25,192	13,542
Missouri			8,485	3,118
Ohio	193,848	228,432	134,178	123,992
Pennsylvania	3,608,095	2,031,305	11,336,985	6,992,573
Tennessee	179,311	124,137	619,016	523,400
West Virginia	148,480	135,944	1,025,885	686,570
All other states and territories (*a*)	132,000	135,000	494,540	586,684

a Includes establishments in the following states, grouped in order to avoid disclosing individual establishments: for 1889, Georgia, Illinois, Indian territory, Montana, Utah, Virginia, Washington, and Wisconsin; for 1880, Georgia and Illinois.

The coal consumed in the manufacture of coke is classified under four divisions, viz, run of mine or lump, unwashed; run of mine or lump, washed; slack, unwashed; and slack, washed. Where coal is mined exclusively for coke making, the run of the mine or lump, unwashed, is principally used. The quantity and cost of the coal used, classified as above mentioned, is given in the following statement:

STATEMENT OF QUANTITY AND COST OF DIFFERENT CLASSES OF COAL USED, COKE MANUFACTURE: 1889.

CLASSES OF COAL.	Tons.	Cost.
Total	15,795,087	$11,110,700
Run of mine or lump, unwashed	11,631,436	8,255,542
Run of mine or lump, washed	421,074	305,983
Slack, unwashed	3,195,322	2,333,597
Slack, washed	547,255	215,578

Of the total quantity of coal used, the run of mine or lump, unwashed, contributed 73.64 per cent; the run of mine or lump, washed, 2.67 per cent; slack, unwashed, 20.23 per cent, and slack, washed, 3.46 per cent.

The average cost of each of the various grades of coal was as follows: run of mine or lump, unwashed, 71 cents per ton; washed, 73 cents; slack, unwashed, 73 cents; washed, 39 cents. The cost of slack coal, unwashed, is considerably increased to the coke manufacturer in many cases by reason of the handling and freight charges necessary to bring it to the point of consumption. In the case of washed slack, it is evident that the slack, unwashed, was regarded as of little value.

The schedule of inquiry used in collecting the statistics of coke manufacture contained separate questions as to the quantity and cost of fire brick, red brick, castings, and wood, but in most establishments the accounts were not kept so as to enable separate answers to be made, and all such materials are included in the tabular statements under the head of "All other materials" with sundry other materials used at the ovens.

The statement on the following page gives the relative rank of the states and territories in the production of coke, with the number of tons produced and the percentage that the total in each state is of the total for the United States at the censuses of 1880 and 1890.

COMPARATIVE STATEMENT OF PRODUCTION AND RANK OF EACH STATE AND TERRITORY, COKE MANUFACTURE: 1880 AND 1889.

STATES AND TERRITORIES.	RANK.		TONS OF COKE.		PERCENTAGE OF TOTAL OUTPUT.		STATES AND TERRITORIES.	RANK.		TONS OF COKE.		PERCENTAGE OF TOTAL OUTPUT.	
	1880	1889	1880	1889	1880	1889		1880	1889	1880	1889	1880	1889
United States	.....	.....	2,752,475	10,008,169	100.00	100.00	Montana	.....	10	.....	(a)	.....	.....
Pennsylvania	1	1	2,317,149	7,372,653	84.18	73.67	Kansas	.....	11	.....	13,910	.....	0.14
Alabama	6	2	42,035	1,055,823	1.53	10.55	Kentucky	.....	12	.....	13,021	.....	0.13
West Virginia	3	3	95,720	612,645	3.48	6.12	Illinois	8	13	7,600	(a)	0.28	.....
Tennessee	4	4	91,675	356,964	3.33	3.57	Indiana	9	14	1,000	8,301	0.04	0.08
Colorado	7	5	18,000	199,638	0.65	1.99	Indian territory	.....	15	.....	(a)	.....	.....
Virginia	.....	6	.....	(a)	.....	.....	Missouri	.....	16	.....	5,275	.....	0.05
Georgia	5	7	70,000	(a)	2.54	.....	Washington	.....	17	.....	(a)	.....	.....
Ohio	2	8	100,206	75,826	3.97	0.76	Utah	.....	18	.....	(a)	.....	.....
Wisconsin	.....	9	.....	(a)	.....	.....	All other states and territories. (a)	.....	.....	.....	204,113	.....	2.04

a Includes establishments in the following states, grouped in order to avoid disclosing individual establishments: for 1889, Georgia, Illinois, Indian territory Montana, Utah, Virginia, Washington, and Wisconsin.

The statistics as exhibited in the above statement show an increase in states that in 1880 were established seats of coke manufacture, and moreover in certain states where it had no existence in 1880, notably Kansas, Kentucky, and Missouri.

Pennsylvania still maintains its rank as the leading coke manufacturing state. While its percentage of the total product for 1880 was 84.18 and for 1889 is 73.67, showing a relative decrease, the actual increase in the number of tons is 5,055,504, more than one-half of the entire production for 1889, and the percentage of increase for the state is 218.18.

Alabama has advanced from sixth place in 1880 to second in 1889. Its percentage of the total production for 1880 was 1.53 and for 1889 is 10.55. The actual increase is 1,013,788 tons. During the census year the blast furnaces of Alabama consumed 1,172,471 tons of coke, exceeding the production of the state by 116,648 tons.

West Virginia is in 1889 as it was in 1880, the third coke producing state. It produced, in 1880, 3.48 per cent of the entire supply, and in 1889, 6.12 per cent, while the actual increase is 516,925 tons.

Tennessee occupies the fourth place in coke production, as it did in 1880. Its product in 1880 was 3.33 per cent of the whole, and in 1890, 3.57 per cent, being an increase of 265,289 tons.

With the single exception of Ohio, the industry has increased in all the coke manufacturing states. During the decade Ohio has fallen from second to eighth place, its production undergoing an actual decrease of 33,470 tons. The coal found in Ohio is generally unsuitable for the manufacture of a superior grade of coke, and the nearness of the Connellsville (Pennsylvania) and the West Virginia coal fields has led the large establishments to draw their supply from these sources.

Returns were received from two establishments in New Mexico, but they are so incomplete as to be useless for census purposes.

RELATIVE PRODUCTIVE RANK OF COKE DISTRICTS.

In the statement on the following page the 13 principal coke districts or regions are arranged in the order of their importance as producing centers, the number of establishments and production for each district is given, also the percentage that the quantity of coke produced in each district is of the total production for the United States. These 13 districts produced 9,298,614 tons of coke during the census year, or 92.91 per cent of the output of the entire country, the Connellsville district, Pennsylvania, alone producing 56.16 per cent of the entire quantity and 76.23 per cent of the total for that state.

STATEMENT OF QUANTITY AND VALUE OF PRODUCTS, COKE MANUFACTURE, BY DISTRICTS: 1889.

DISTRICTS.	Rank.	Number of establishments reporting.	Number of tons of coke.	Value of products.	Percentage of total quantity.
The United States	.....	218	10,008,169	$16,498,345	100.00
Connellsville, Pennsylvania	1	32	5,620,458	7,533,522	56.16
Warrior, Alabama	2	15	964,524	2,249,604	9.64
Upper Connellsville, Pennsylvania	3	12	417,262	669,828	4.17
Tennessee, (a) Tennessee	4	8	356,564	726,004	3.57
Allegheny Mountain and Somerset, Pennsylvania	5	15	354,288	b601,963	3.54
Flat Top, West Virginia and Virginia	6	14	321,687	542,218	3.21
Reynoldsville and Walston, Pennsylvania	7	5	312,822	436,591	3.12
Pittsburg, Pennsylvania	8	13	224,856	c482,984	2.25
New River, West Virginia	9	11	185,044	309,294	1.85
Irwin, Pennsylvania	10	5	183,977	250,747	1.84
El Moro, Colorado	11	4	130,387	398,159	1.30
Clearfield and Center, Pennsylvania	12	6	120,734	215,112	1.21
Northern, West Virginia	13	14	105,611	179,601	1.05
Total for 13 districts	.....	154	9,298,614	14,625,627	92.91
All other districts	.....	64	709,555	d1,872,718	7.09

a Includes the entire state.
b Includes other products valued at $125.
c Includes other products valued at $3,352.
d Includes other products valued at $414.

RELATION OF PRODUCT TO COST.

The following is a comparative statement of the total quantity and cost of coal used in the manufacture of coke, the quantity and value of coke produced, and the quantity and cost of coal per ton of coke in 1880 and 1889:

COMPARATIVE STATEMENT OF QUANTITY AND COST OF COAL USED IN THE MANUFACTURE OF COKE: 1880 AND 1889.

ITEMS.	1880	1889
Total coal used (tons)	4,360,110	15,795,087
Total cost of coal	$2,761,657	$11,110,700
Average cost of coal per ton	$0.63	$0.70
Tons of coke made	2,752,475	10,008,169
Value of coke made	$5,359,489	$16,494,454
Average value of coke per ton	$1.95	$1.65
Quantity of coal per ton of coke (pounds)	3,168	3,156
Average cost of coal to ton of coke	$1.00	$1.11

The average cost of wages to the ton of coke was 42 cents in 1889 and 44 cents in 1880, and the average cost per ton of coke of fire brick for repairs, red brick, and all other similar materials in 1889 was 4 cents, and in 1880 8 cents.

An examination of the relation between the number of employés and the output of coke shows that the methods of handling coke have been much improved during the past decade, the number of employés in 1880 being to the number of tons of coke manufactured as 1 to 877, and in 1889 as 1 to 1,093. This difference in relation may be materially changed by a difference in the time the industry was in operation during the two periods, but as there are no data included in the figures for 1880 from which such average time can be ascertained, it is not possible to say to what extent this relative difference would be affected.

The following statement shows the cost of wages and materials in manufacturing a product valued at $100; also the amount of capital shown for the same, as compiled from the reports at the censuses of 1880 and 1890:

COMPARATIVE STATEMENT OF CAPITAL, WAGES, AND MATERIALS IN PRODUCT VALUED AT $100, COKE MANUFACTURE: 1880 AND 1889.

YEARS.	Capital.	Wages.	Materials.
1880	$89.00	$22.35	$55.89
1889	105.85	25.37	69.76

The following statement presents the percentage of yield of coal in coke for the United States and for each state in which three or more establishments were in operation during the year 1889:

STATEMENT OF QUANTITY AND PERCENTAGE OF YIELD OF COAL IN COKE: 1889.

STATES AND TERRITORIES.	Number of tons of coal used.	Number of tons of coke manufactured.	Percentage of yield in coke.
The United States	15,795,087	10,008,169	63.36
Alabama	1,789,047	1,055,823	59.02
Colorado	323,731	199,638	61.67
Indiana	16,428	8,301	50.53
Kansas	21,600	13,910	64.40
Kentucky	25,102	13,021	51.60
Missouri	8,485	5,275	62.17
Ohio	134,178	75,826	56.51
Pennsylvania	11,336,985	7,372,653	65.03
Tennessee	619,016	356,964	57.67
West Virginia	1,025,885	612,645	59.72
All other states and territories (a)	494,540	294,113	59.47

a Includes establishments in the following states and territories, grouped in order to avoid disclosing individual establishments: Georgia, Illinois, Indian territory, Montana, Utah, Virginia, Washington, and Wisconsin.

In 1880 there were consumed 4,360,110 tons of coal in the production of 2,752,475 tons of coke, or an average yield of coke per ton of coal of 63.13 per cent. The small increase in the yield during the decade is due to the great growth of coke manufacture in the southern states, where the output of coke to the ton of coal used is below that achieved at works in Pennsylvania. These reports of yield, however, must be received with some reservation. At many works the coal charged is not weighed. At some the measured bushel or ton is used which may or may not be the same number of pounds as the weighed bushel or ton. In cases where slack is used, often the coal is not weighed at all, but only estimated. The greater care that is being taken in the preparation of the coal, the use of better ovens, and the introduction of more economical methods of working, it is believed, will lead to an increased yield of coal in coke in the future.

Special inquiries were made at the census of 1890 to determine the miscellaneous expenses incurred in manufacturing other than the expenditures for materials and labor, but the conditions under which the business of coke making is conducted at different plants rendered it difficult, and in many instances impossible, to secure from each producer accurate data in regard to these items. The following statement presents the totals obtained in answer to these questions, with the number of establishments reporting each item:

STATEMENT OF MISCELLANEOUS EXPENSES AS REPORTED AT THE CENSUS OF 1890, COKE MANUFACTURE.

ITEMS.	Number of reports.	Amount.
Total	.....	$394,784
Rent of tenancy	13	10,716
Taxes	112	78,284
Insurance	45	10,633
Repairs, ordinary, of buildings and machinery	69	54,144
Amount paid to contractors	4	59,501
Interest paid on cash used in the business	22	39,204
All sundries (not reported in any of the foregoing items)	46	142,302

CONSUMPTION OF COKE BY BLAST FURNACES.

The principal consumption of coke is in the manufacture of pig iron, the blast furnaces of the country consuming, during the census year 1890, 9,237,935 short tons of coke.

The following is a statement of the quantity of coke consumed by blast furnaces in 1880 and 1890, with the percentage that the quantity so consumed is of the total production:

COMPARATIVE STATEMENT OF QUANTITY OF COKE CONSUMED IN BLAST FURNACES: 1880 AND 1890.

YEARS.	Total quantity of coke manufactured. (Tons.)	COKE USED BY BLAST FURNACES.	
		Tons.	Percentage of total quantity.
1880	2,752,475	2,128,255	77.32
1890	10,008,169	9,237,935	92.30

As a further evidence of the increased use of coke by blast furnaces between 1880 and 1890, it appears that the total cost of fuel consumed by the blast furnaces of the country, as reported in the census of 1880, was $21,917,002, of which $8,129,240 was paid for coke, or 37.09 per cent of the total. The total cost of fuel used by blast furnaces in 1890 was $37,884,383, of which $27,435,780 was paid for coke, being 72.42 per cent of the whole amount. Of the 3,345,703 tons of pig iron produced in 1880 by the aid of mineral fuel, 1,517,553 tons, or 45.36 per cent, were produced with coke, or in some instances with a mixture of bituminous coal and coke; and in 1890, of the 9,241,896 tons of pig iron manufactured with mineral fuel, 7,017,769 tons, or 75.93 per cent, were manufactured with coke, or in some instances with a mixture of bituminous coal and coke. Coke is also extensively used in eastern Pennsylvania, New York, and New Jersey as a mixture with anthracite coal in pig iron manufacture.

TABULAR STATEMENTS.

The statistical tables accompanying this report are as follows:

Table 1 is a comparative statement by state totals, showing the items of the inquiry common to both censuses.

Table 2 is a detailed statement of the data concerning the manufacture of coke as reported at the Eleventh Census. It shows the various subdivisions of capital, miscellaneous expenses, employés and wages, materials used, and products; also the characteristics of plant.

Table 3 is a presentation of the statistics of employés and wages. It shows the employés classified as (1) officers or firm members; (2) clerks; (3) operatives, including skilled and unskilled, and their further division by males, females, and children, with the total wages for each class, and the average weekly earnings per employé; (4) pieceworkers. It also shows the weekly rates of wages paid and the average number of employés, males, females, and children, at each rate.

The largest number of employés at coke plants would be classed as common labor, the character of the work requiring strength and physical endurance more than skilled manipulation on the part of most workmen. The returns from the manufacturers in regard to the separation of the employés into skilled and unskilled showed such varying opinions as to what constituted each class that it has been considered impracticable to show skilled and unskilled employés separately.

The schedule of inquiry called for the "average number employed during the year", that is, the average number having continuous employment for the full time reported by individual establishments. Upon this basis the computations are made to obtain "the average weekly earnings". The average number of employés reported for each establishment is multiplied by the number of weeks the establishment was in operation; the result is the number of weeks required for 1 employé to perform the labor. Aggregating such results of individual reports, the number of weeks required for 1 employé to perform the entire labor is obtained. This number, used as a divisor for the total wages reported, produces the true average weekly earnings.

The ton reported in the appended tables is the short ton of 2,000 pounds.

TABLE 1.—DETAILED COMPARATIVE STATEMENT, COKE

	STATES AND TERRITORIES.	Year.	Number of establishments reporting. (a)	Capital.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.					MATERIALS USED.				
					Aggregates.		Males above 16 years.	Females above 15 years.	Children.	Aggregate cost.	Coal.			
											Total.		Washed and unwashed. Run of mine or lump.	
					Average number.	Total wages					Tons.	Cost.	Tons	Cost.
1	The United States	1880	126	$4,769,858	3,140	$1,197,744	3,066	3	71	$2,995,441	4,360,110	$2,761,657	3,729,328	$2,392,449
		1889	218	17,462,729	9,159	4,186,264	9,102	1	56	11,509,737	15,795,087	11,110,700	12,052,510	8,561,525
2	Alabama	1880	3	106,500	64	38,500	64	.....	.....	76,618	67,376	75,314	66,376	73,814
		1889	19	1,368,238	1,128	430,948	1,093	.....	35	1,810,274	1,789,047	1,755,876	1,348,104	1,324,386
3	Colorado	1880	1	150,000	75	13,500	75	.....	.....	30,100	23,500	29,500	29,500	22,600
		1889	7	594,393	253	166,735	253	.....	.....	408,183	323,731	399,778	41,680	64,270
4	Indiana	1880	1	8,000	4	300	4	.....	.....	2,225	1,500	2,025	1,500	2,025
		1889	3	48,930	22	8,164	22	.....	.....	20,133	16,428	16,156	5,928	13,260
5	Kansas	1880	(c)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1889	6	17,960	19	5,845	19	.....	.....	9,099	21,600	9,011	.....	.....
6	Kentucky	1880	(c)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1889	5	80,070	28	11,279	28	.....	.....	14,155	25,192	13,542	2,942	2,830
7	Missouri	1880	(c)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		1889	3	5,275	5	1,881	5	.....	.....	3,557	8,485	3,118	.....	.....
8	Ohio	1880	15	144,012	153	51,977	150	.....	3	233,831	193,848	228,432	148,202	181,112
		1889	13	320,215	143	65,388	143	.....	.....	125,565	134,178	123,992	85,514	82,907
9	Pennsylvania	1880	89	3,759,325	2,444	983,431	2,379	3	62	2,241,154	3,608,095	2,031,305	3,144,969	1,786,717
		1889	98	12,000,829	5,954	2,976,692	5,950	1	3	7,280,566	11,336,985	6,992,573	9,750,174	6,185,835
10	Tennessee	1880	4	200,021	114	38,820	114	.....	.....	132,220	170,311	124,137	80,911	75,137
		1889	8	541,350	256	93,385	245	.....	11	532,493	619,016	523,400	264,462	203,815
11	West Virginia	1880	11	292,000	163	48,942	159	.....	4	138,964	148,480	135,944	140,780	131,044
		1889	45	1,716,837	1,074	310,268	1,067	.....	7	709,576	1,025,885	686,576	386,584	294,357
12	All other states and territories.	d1880	2	110,000	123	22,274	121	.....	2	140,320	132,000	135,000	117,000	120,000
		e1889	11	768,041	277	109,679	277	.....	.....	596,136	494,540	586,684	167,122	329,805

a In 1889 concerns having more than one plant were counted as one establishment, but in 1880 each plant was counted as an establishment.
b The quantity and cost of coal under this head, with the exception of the added cost of washing in 1880, is included under the head "Coal, washed and unwashed".

MANUFACTURE, BY STATES AND TERRITORIES: 1880 AND 1889.

MATERIALS USED—continued.					PRODUCTS.				OVENS, PITS, OR MOUNDS (NUMBER).					
Coal—Continued.														
Washed and unwashed—Continued.		Washed. (b)		All other materials.	Total value.	Coke.		All other products.	Total.	Beehive ovens.	Belgian or flue ovens.	Other style ovens.	Pits or mounds.	
Slack.		Run of mine or lump and slack.												
Tons.	Cost.	Tons.	Cost.	Cost.		Tons.	Value.	Value.						
630,782	$358,558	751,824	$533,818	$233,784	$5,359,489	2,752,475	$5,359,489	.....	9,738	9,424	242	30	42	1
3,742,577	2,549,175	968,329	521,561	399,037	16,498,345	10,008,169	16,494,454	$3,891	32,659	32,129	233	278	19	
1,000	1,500	.....	.....	1,304	148,026	42,035	148,026	.....	216	216	.....	.....	.....	2
440,943	431,490	9,000	4,500	54,398	2,474,377	1,055,823	2,474,377	.....	3,693	3,459	160	74	.....	
.....	.....	29,500	29,500	600	90,000	18,000	90,000	.....	128	128	.....	.....	.....	3
282,051	335,508	.....	.....	8,405	673,479	199,638	673,479	.....	872	672	.....	200	.....	
.....	.....	.....	.....	200	3,000	1,000	3,000	.....	20	20	.....	.....	.....	4
10,500	2,896	10,500	2,896	3,977	25,922	8,301	25,922	.....	102	102	.....	.....	.....	
21,600	9,011	.....	.....	88	26,593	13,910	26,593	.....	52	52	.....	.....	.....	5
22,250	10,712	15,930	3,982	613	29,769	13,021	29,769	.....	164	164	.....	.....	.....	6
8,485	3,118	.....	.....	439	5,800	5,275	5,800	.....	9	9	.....	.....	.....	7
45,556	47,320	.....	.....	5,399	334,546	109,296	334,546	.....	619	619	.....	.....	.....	8
48,664	41,025	6,608	1,652	1,573	219,560	75,826	219,560	.....	462	462	.....	.....	.....	
463,126	244,588	596,713	426,581	209,849	4,190,136	2,317,149	4,190,136	.....	7,589	7,305	242	.....	42	9
1,586,811	806,738	801,810	392,811	287,993	10,415,028	7,372,653	10,412,101	3,527	21,405	21,338	48	.....	19	
98,400	49,000	110,611	62,737	8,092	212,493	91,675	212,493	.....	589	589	.....	.....	.....	10
354,554	259,585	5,035	5,035	9,093	726,004	356,964	726,004	.....	1,581	1,577	.....	4	.....	
7,700	4,900	.....	.....	3,020	216,588	95,720	216,588	.....	407	407	.....	.....	.....	11
639,301	392,213	81,769	37,166	23,006	1,130,762	612,645	1,130,398	364	3,140	3,140	.....	.....	.....	
15,000	11,250	15,000	15,000	5,320	164,700	77,600	164,700	.....	170	140	.....	30	.....	12
327,418	256,879	37,677	73,519	9,452	770,451	294,113	770,451	.....	1,179	1,154	25	.....	.....	

c None reported in 1880.
d Embraces establishments distributed as follows: Georgia, 1; Illinois, 1.
e Embraces establishments distributed as follows: Georgia, 1; Illinois, 2; Indian territory, 1; Montana, 2; Utah, 1; Virginia, 2; Washington, 1; Wisconsin, 1.

TABLE 2.—DETAILED STATEMENT, COKE

	STATES AND TERRITORIES.	Number of establishments reporting.	CAPITAL.									
			Aggregate.	Value of plant.						Live assets.			
				Total.	Land.	Buildings.	Ovens.	Machinery, tools, and implements.	Railway plant and water supply.	Total.	Raw materials.	Stock in process and finished products on hand.	Cash, bills and accounts receivable, and all sundries not elsewhere reported.
1	The United States..	218	$17,462,729	$15,980,284	$1,405,342	$869,725	$10,817,624	$823,790	$2,063,803	$1,482,445	$186,751	$110,822	$1,184,872
2	Alabama	19	1,368,238	1,338,792	39,425	44,425	1,111,454	65,925	77,563	29,446	2,358	11,413	15,675
3	Colorado	7	594,393	561,040	600	20,500	471,341	33,813	34,786	33,353	3,100	19,025	11,228
4	Indiana	3	48,930	48,700	1,500	2,500	36,200	3,500	5,000	230	30	200	.....
5	Kansas	6	17,960	17,040	600	75	15,550	815	.....	920	100	820	.....
6	Kentucky	5	80,670	77,120	1,100	8,700	40,500	8,070	18,750	3,550	1,200	500	1,850
7	Missouri	3	5,275	5,275	.....	.....	4,450	825	.....	.....	.....	.....	.....
8	Ohio	13	320,215	306,846	14,800	134,516	124,550	27,030	5,950	13,369	6,320	3,880	3,169
9	Pennsylvania	98	12,000,820	10,962,717	1,068,372	562,962	7,014,347	561,779	1,755,257	1,038,103	15,727	38,900	983,476
10	Tennessee	8	541,350	493,350	6,800	6,500	450,750	17,300	12,000	48,000	2,000	8,500	37,500
11	West Virginia	45	1,716,837	1,592,526	213,345	70,097	1,111,582	60,123	137,379	124,311	3,081	4,256	116,974
12	All other states and territories. (a)	11	768,041	576,878	58,800	19,450	436,900	44,610	17,118	191,163	152,835	23,328	15,000

	STATES AND TERRITORIES.	AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES—continued.				MATERIALS USED.						
		Pieceworkers.				Aggregate cost.	Coal.					
		Males above 16 years.		Children.			Total.		Run of mine or lump.			
									Unwashed.		Washed.	
		Number.	Wages.	Number.	Wages.		Tons.	Cost.	Tons.	Cost.	Tons.	Cost.
1	The United States..	4,494	$2,162,662	24	$3,950	$11,509,737	15,795,087	$11,110,709	11,631,436	$8,255,542	421,074	$305,983
2	Alabama	709	287,808	20	3,350	1,810,274	1,789,047	1,755,876	1,348,104	1,324,386	.....	.....
3	Colorado	109	76,178	.....	.....	408,183	323,731	399,778	41,680	64,270	.....	.....
4	Indiana	4	1,264	.....	.....	20,133	16,428	16,156	5,928	13,260	.....	.....
5	Kansas	1	150	.....	.....	9,099	21,600	9,011	.....	.....	.....	.....
6	Kentucky	11	3,848	.....	.....	14,155	25,192	13,542	2,942	2,830	.....	.....
7	Missouri	.....	.....	.....	.....	3,557	8,485	3,118	.....	.....	.....	.....
8	Ohio	46	21,936	.....	.....	125,565	134,178	123,992	85,514	82,967	.....	.....
9	Pennsylvania	3,027	1,583,121	.....	.....	7,280,566	11,336,985	6,902,573	9,433,209	5,984,218	316,905	201,617
10	Tennessee	82	34,354	4	600	532,493	619,016	523,400	264,462	263,815	.....	.....
11	West Virginia	368	103,702	.....	.....	709,576	1,025,885	686,570	304,815	257,191	81,769	37,166
12	All other states and territories.	137	50,301	.....	.....	596,136	494,540	586,684	144,722	262,605	22,400	67,200

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Georgia, 1; Illinois, 2; Indian territory, 1; Montana, 2; Utah, 1; Virginia, 2; Washington, 1; Wisconsin, 1.

MANUFACTURE, BY STATES AND TERRITORIES: 1889.

MISCELLANEOUS EXPENSES.								AVERAGE NUMBER OF EMPLOYÉS AND TOTAL WAGES.								
								Aggregates.		Officers, firm members, and clerks.				Operatives, skilled and unskilled.		
										Males above 16 years.		Females above 15 years.		Males above 16 years.		Children.	
Total.	Rent paid for tenancy.	Taxes.	Insurance.	Repairs, ordinary, of buildings and machinery.	Amount paid to contractors.	Interest paid on cash used in the business.	All sundries not elsewhere reported.	Average number.	Total wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.	Number.	Wages.
$394,784	$10,716	$78,284	$10,633	$54,144	$59,501	$39,294	$142,302	9,159	$4,186,264	160	$113,332	1	$300	4,448	$1,901,456	32	$4,564
7,994	225	4,584	.....	900	.....	1,245	1,040	1,128	436,948	8	4,805	.....	.....	376	138,645	15	2,340
1,360	.....	860	300	200	.....	.....	.....	253	166,735	6	5,070	.....	.....	138	85,487	.....	.....
290	.....	65	.....	100	.....	.....	125	22	8,164	.....	.....	.....	.....	18	6,900	.....	.....
565	.....	165	.....	200	.....	.....	200	19	5,845	.....	.....	.....	.....	18	5,695	.....	.....
436	.....	65	.....	170	.....	51	150	28	11,279	2	500	.....	.....	15	6,931	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	5	1,881	.....	.....	.....	.....	5	1,881	.....	.....
6,441	1,250	1,209	230	926	2,646	.....	180	143	65,388	3	1,664	.....	.....	94	41,788	.....	.....
256,263	6,011	61,913	7,369	35,811	3,432	20,767	120,960	5,954	2,976,692	98	73,500	1	300	2,825	1,319,326	3	445
41,862	.....	1,650	54	3,480	31,778	4,000	900	256	93,385	.....	.....	.....	.....	163	57,420	7	1,011
53,310	3,230	5,530	2,680	10,582	.....	12,641	18,647	1,074	310,268	40	25,893	.....	.....	659	179,905	7	768
26,263	.....	2,243	.....	1,775	21,645	500	100	277	109,679	3	1,900	.....	.....	137	57,478	.....	.....

MATERIALS USED—continued.					PRODUCTS.				OVENS, PITS, OR MOUNDS (NUMBER).						
Coal—Continued.															
Slack.				All other materials.	Total value.	Coke.		All other products.	Total.	Beehive ovens.	Belgian or flue ovens.	Other style ovens.	Pits or mounds	Washers. (Number.)	Crushers. (Number.)
Unwashed.		Washed.													
Tons.	Cost.	Tons.	Cost.	Cost.		Tons.	Value.	Value.							
3,195,322	$2,333,597	547,255	$215,578	$399,037	$16,498,345	10,008,169	$16,494,454	$3,891	32,659	32,129	233	278	19	51	33
431,943	426,990	9,000	4,500	54,398	2,474,377	1,055,823	2,474,377	.....	3,693	3,459	160	74	.....	2	4
282,051	335,508	.....	.....	8,465	673,479	199,638	673,479	.....	872	672	.....	200	.....	.....	.....
.....	.....	10,500	2,806	3,977	25,922	8,301	25,922	.....	102	102	.....	.....	.....	4	1
21,600	9,011	.....	.....	88	26,593	13,910	26,593	.....	52	52	.....	.....	.....	.....	.....
6,320	6,780	15,930	3,982	613	29,769	13,021	29,769	.....	164	164	.....	.....	.....	1	1
8,485	3,118	.....	.....	439	5,800	5,275	5,800	.....	9	9	.....	.....	.....	.....	.....
42,056	30,373	6,608	1,652	1,573	219,560	75,826	219,560	.....	462	462	.....	.....	.....	5	2
1,101,906	615,544	484,905	191,194	287,993	10,415,628	7,372,653	10,412,101	3,527	21,405	21,338	48	.....	19	31	14
349,519	254,550	5,035	5,035	9,093	726,004	356,964	726,004	.....	1,581	1,577	.....	4	.....	1	2
639,301	392,213	.....	.....	23,006	1,130,762	612,645	1,130,398	364	3,140	3,140	.....	.....	.....	2	5
312,141	250,560	15,277	6,319	9,452	770,451	294,113	770,451	.....	1,179	1,154	25	.....	.....	5	4

TABLE 3.—CLASSIFICATION OF EMPLOYÉS AND WAGES AND AVERAGE NUMBER OF EMPLOYÉS AT THE DIFFERENT WEEKLY RATES OF PAY, COKE MANUFACTURE, BY STATES AND TERRITORIES: 1889.

STATES AND TERRITORIES.	Number of establishments reporting.	AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS.									
		Aggregates.		Officers or firm members actively engaged in the industry or in supervision.			Clerks.				
				Males above 16 years.			Males above 16 years.			Females above 15 years.		
		Average number.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.
The United States	218	9,159	$4,186,264	37	$21.24	$33,297	123	$14.96	$80,035	1	$8.93	$300
Alabama	19	1,128	436,948	3	20.49	2,300	5	12.17	2,505			
Colorado	7	253	106,735	1	25.76	1,200	5	15.20	3,870			
Indiana	3	22	8,164									
Kansas	6	19	5,845									
Kentucky	5	28	11,279	1	11.54	300	1	7.69	200			
Missouri	3	5	1,881									
Ohio	13	143	65,388				3	10.67	1,604			
Pennsylvania	98	5,954	2,976,092	15	20.59	14,900	83	15.81	58,600	1	8.93	300
Tennessee	8	256	93,385									
West Virginia	45	1,074	310,268	17	21.05	14,597	23	12.73	11,296			
All other states and territories (a.)	11	277	109,679				3	16.55	1,900			

STATES AND TERRITORIES.	AVERAGE NUMBER OF EMPLOYÉS IN EACH CLASS AND AVERAGE WEEKLY EARNINGS—continued.								AVERAGE NUMBER OF HOURS IN ORDINARY DAY OF LABOR.	
	Operatives, skilled and unskilled.						Pieceworkers.			
	Males above 16 years.			Children.						
	Number.	Average weekly earnings per employé.	Total wages.	Number.	Average weekly earnings per employé.	Total wages.	Number.	Total wages.	May to November.	November to May.
The United States	4,448	$10.15	$1,901,456	32	$3.64	$4,564	4,518	$2,166,612	9.75	9.71
Alabama	376	8.00	138,645	15	3.96	2,340	729	291,158	9.68	9.58
Colorado	138	12.29	85,487				109	76,178	9.86	9.86
Indiana	18	7.44	6,900				4	1,264	9.33	9.33
Kansas	18	9.96	5,695				1	150	9.58	9.58
Kentucky	15	10.73	6,931				11	3,848	9.70	9.30
Missouri	5	9.98	1,881						11.33	11.33
Ohio	94	9.03	41,788				46	21,936	9.75	9.75
Pennsylvania	2,825	10.99	1,319,326	3	3.80	445	3,027	1,583,121	9.68	9.66
Tennessee	163	7.71	57,420	7	2.89	1,011	86	34,954	9.75	9.75
West Virginia	659	7.91	179,905	7	3.92	766	368	103,702	9.84	9.82
All other states and territories	137	9.73	57,478				137	50,301	9.00	9.70

STATES AND TERRITORIES.	WEEKLY RATES OF WAGES PAID AND AVERAGE NUMBER OF EMPLOYÉS AT EACH RATE, INCLUDING OFFICERS, FIRM MEMBERS, AND CLERKS, BUT NOT THOSE EMPLOYED ON PIECEWORK. (b)															
	Males above 16 years.												Females above 15 years.	Children.		
	Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.	$7 and over but under $8.	$8 and over but under $9.	$9 and over but under $10.	$10 and over but under $12.	$12 and over but under $15.	$15 and over but under $20.	$20 and over but under $25.	$25 and over.	$8 and over but under $9.	Total number.	Under $5.	$5 and over but under $6.	$6 and over but under $7.
The United States	4,608	19	13	345	1,072	704	853	289	895	316	26	76	1	32	29	2	1
Alabama	384	1	2	158	93	32	57	3	24	6	1	7		15	15		
Colorado	144			1			59	6	28	41	4	5					
Indiana	18			4	11	2		1									
Kansas	18				1	1	12	2	1	1							
Kentucky	17		1	1	1	4	5	1	2	2							
Missouri	5					2		2	1								
Ohio	97			13	42	3	12	7	19			1					
Pennsylvania	2,923	5	1	40	407	585	587	230	767	239	14	48	1	3	3		
Tennessee	103	7	8	72	10	14	35	7	9	1				7	7		
West Virginia	699	6	1	56	448	60	50	27	18	19	5	9		7	4	2	1
All other states and territories.	140				59	1	36	3	26	7	2	6					

a Includes states having less than 3 establishments in order that the operations of individual establishments may not be disclosed. These establishments are distributed as follows: Georgia, 1; Illinois, 2; Indian territory, 1; Montana, 2; Utah, 1; Virginia, 2; Washington, 1; Wisconsin, 1.

b In comparing the weekly rates of wages and number of employés at each rate with the average weekly earnings, it must be remembered that it is not practicable to obtain true average weekly earnings from the table of weekly rates, because the term of employment varies for employés reported at the respective rates.